This Issue—Chicago Show Report

MOTOR AGE

Vol. XXXI
No. 5

CHICAGO, FEBRUARY 1, 1917

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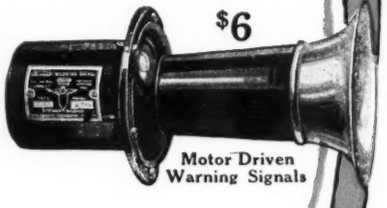

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MOTOR AGE

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Vol. XXXI February 1, 1917 No. 5

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Vol. XXXI, No. 5 Chicago, February 1, 1917 $3.00 Per Year

1917 SHOW CHICAGO'S BIGGEST

by W. K. Gibbs

COLISEUM, Chicago, Jan. 27 — At 2 o'clock this afternoon, Chicago became the capital of the motor car world and the Coliseum, with its adjoining buildings, the capitol. Beginning to-day with the opening of the seventeenth annual national motor show, Chicago became and will continue to be the motorists' mecca for one week. Within a few minutes after the doors were opened, the wide aisles in the Coliseum were well filled and within an hour the crowd had extended into the Coliesum Annex, the Greer building and the First Regiment Armory which are used as overflow buildings since the industry assumed the magnitude that did not permit of housing the show in the Coliseum proper.

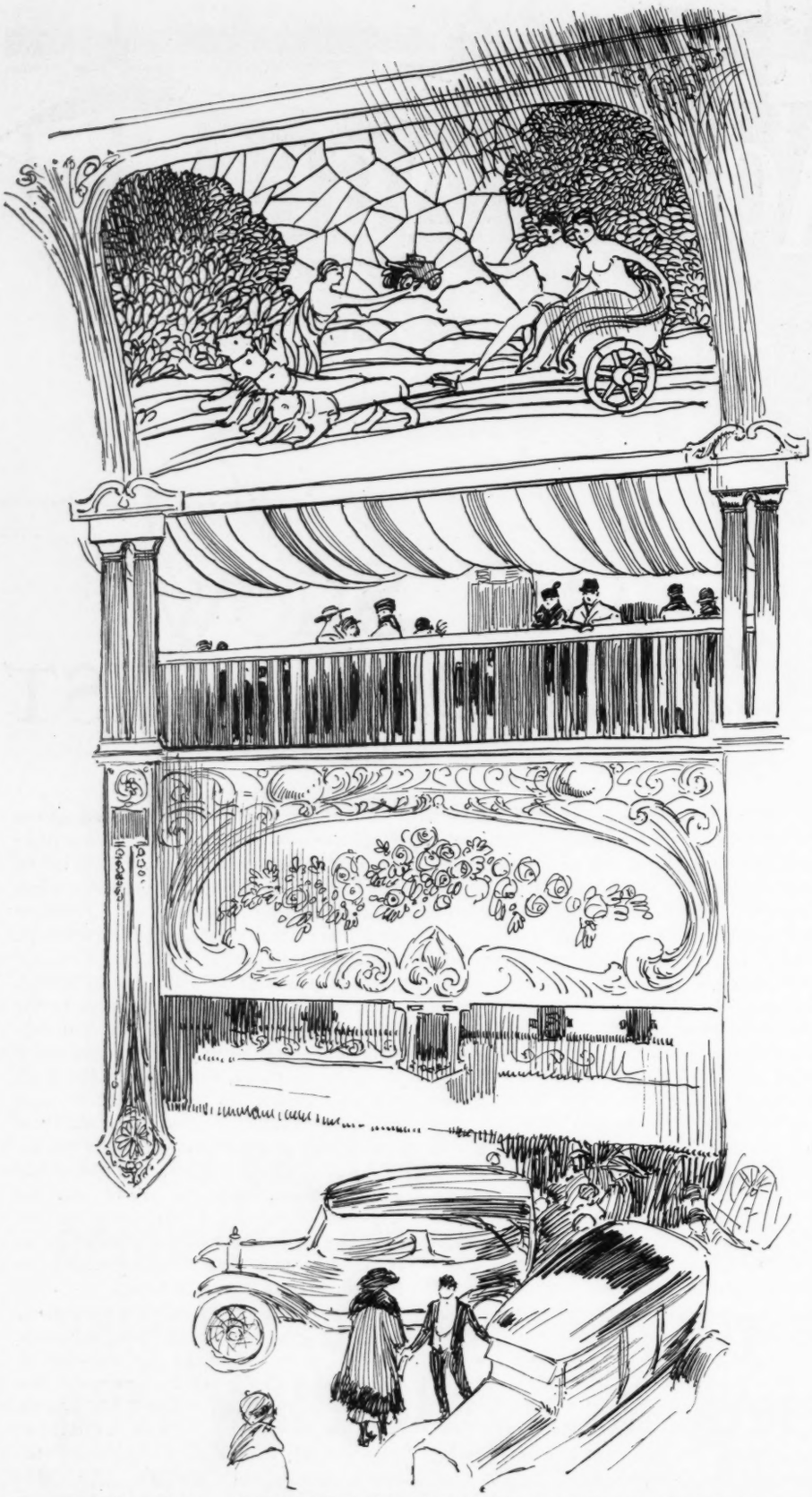
Estimates made to-night at the close of the biggest exhibition of cars Chicago has ever seen, put the attendance at 40,000 which establishes a new first-day record and is looked upon as a strong indication that the attendance this year will go well beyond the 350,000 mark set last year.

The much-heralded attractions of the decorative scheme, in the writer's estimation, do not come up to those of a year ago. Those who had been told that the interior of the Coliseum would be a replica of an old English castle with a combination of the medieval and early English renaissance may have expected too much. The principal decorations are over the arched top of the Coliseum, whereas last year the Nipponese setting was evident without one having to gaze skyward and withal much more attractive.

Pillars, topped with illuminated globes fashioned after Tiffany art glass, outline the center of the floor space. Little lamps, hundreds of them, hang from the ceiling. Along the lower area of the big Coliseum arch runs a series of symbolic paintings, the stained glass effect of which is heightened by a dull glow of light from behind. Some attempt has been made to carry the effect to the buildings other than the Coliseum, but since the major scheme has found its place overhead, the other buildings do not lend themselves to this kind of decoration so readily. Taken all in all there is too little decoration down where the exhibits are. However, those who visited the show to-night, when the crowd was the heaviest oftentimes found vision in any direction except skyward impossible so at least they had something attractive to look at, even if it were not cars.

There was much activity this forenoon and up to the time the hands of the clock pointed to 2 o'clock to get exhibits in place and with few exceptions every one was ready when the doors were thrown open to the public. Three exhibitors' spaces were vacant at 2 o'clock—Pathfinder, Austin and Detroiter. The Pathfinder exhibit was brought in during the dinner hour and the other two are expected to be placed to-morrow morning.

There is little deviation from precedent in the layout of the present show. As usual, the Coliseum main floor is occupied by motor car displays, while the gallery is given over to accessory exhibits. The



Art glass window effects in roof of Coliseum and other decorations as seen by artist

Coliseum annex follows out the same plan as that of the Coliseum proper and in addition there are both cars and accessories in the basement. Only one floor of the Greer building is used and that for cars only. The main floor of the Armory is occupied by gasoline and electric cars and the balconies by accessories.

One finds few changes in exhibit locations from last year, although some that were in the Coliseum last year are now in the Armory and the other adjacent buildings. The leaders in production, however, continue to hold the coveted places.

Comparing this year's exhibit with that of a year ago, it is found that there are twelve more car makers showing to-day than during the 1916 show, the total for this year being ninety-two. Some of this increase is due to the addition of a few makes never shown before and the rest is cars developed within the last year and which made their initial appearance at the New York show. The total number of chassis shown this year is 324, compared with 294 last year. Stripped chassis displays have fallen off slightly, this year's number being fifty whereas fifty-two were shown last year. In almost all cases where a stripped chassis is not shown, there is an engine or some other chassis construction displayed.

Four-cylinder chassis show a loss compared with last year, while six-cylinder chassis show the biggest gain of any type. Of the fours, there are ninety-seven shown as against 106 last year, while sixes total 170 as against 135 in 1916. Forty-one eights are shown this year compared with forty-two for 1916, while this year's showing of twelves is eighteen against eleven last year.

Body Types Interesting Study

Body types offer an interesting study and the casual observer will no doubt at first feel that the industry is giving more thought to open cars than closed. Every type of open car except two- and three-passenger roadsters are shown in greater quantity than last year, the four-passenger roadster which was a child at the beginning of 1916 show, showing prodigious growth in popularity. More than one-half of the total number of exhibitors are showing four-passenger roadsters, while less than 10 per cent are showing three-passenger roadsters which held the stage of popularity a year ago. It seems evident that makers have found a slightly exaggerated cloverleaf seating arrangement to accommodate four passengers is more to be desired than the original cloverleaf pattern to care for only three passengers and consequently they have made body changes to permit the carrying of four, although a number of them have not increased the size of the rear compartment as much as we

How Exhibits Were Divided

	1916	1917
Number of manufacturers exhibiting	80	92
Total number of chassis shown	294	324
Total number of stripped chassis	52	50
Number of four-cylinder chassis	106	97
Number of six-cylinder chassis	135	170
Number of eight-cylinder chassis	42	41
Number of twelve-cylinder chassis	11	18
Total	294	324
Body Types—Open Cars		
Five passenger	64	75
Six and seven passenger	57	54
Two passenger	33	21
Three passenger	23	9
Four passenger	10	47
Total	187	206
Body Types—Closed Cars		
Coupes	7	14
Sedans	10	26
Demountable tops	18	9
Cabriolets	2	0
Limousines	10	12
Landaulet	1	0
Towncars	5	6
Berlines	2	1
Total	55	68
Makers using wire wheels	32	59
Hauk	23	32
R. W.	4	7
Freyer	2	5
Universal	2	1
Spanger	1	0
Kelly	0	3
Hayes	0	10
Makers using cord tires	16	20
Goodrich	10	15
Goodyear	6	5

are likely to find true within another year. Leg room for the two passengers in the rear compartment of four-passenger roadsters in many cases is not sufficient in the cars shown in this year's show, but even at that, it can be said that the four-passenger roadsters are the major attractions of this year's exhibits, especially if one does not take into consideration the de luxe sedans and closed cars many of which are, by reason of their high price, taken out of the popular field of buying.

Seventy-five five-passenger open cars are shown this year, whereas sixty-four were shown last year and the six- and seven-passenger open cars at this year's exhibit total fifty-four compared with fifty-seven in 1916. Two-passenger roadsters dropped from thirty-three to twenty-one in point of numbers shown, compared with last year, and the three-passenger jobs dropped from twenty-three to nine.

Closed car exhibits, while an increase is shown over last year, have hardly kept pace with open body types in number, but in design and refinements probably show greater advances than do the open types. A few years ago one did not expect to find a variety of color in motor car shows while this year the expression "a riot of color" even though trite, is expressive. Not only are variegated hues to be found in body finish, but upholstery and interior finish of closed cars are such as one would expect to find in the modern house of luxury. For example, Hupp is showing a sedan, the lower part of the body being pea green and the upper part tan, the upholstery being blue broadcloth while inside of the top is hand embroidered silk. This is only one of the number of refinements to be found in closed cars that were never thought of a few years ago. Tapestry is being used rather extensively for upholstery purposes in sedans, town cars and coupes.

Entrance to Coliseum taken from East Balcony of main room

One of the attractions of the Paige exhibit is a convertible four-passenger roadster in which the top gives a canopy effect, and, together with the seat, folds into the rear deck giving the car an appearance when closed of a two-passenger job. Special attention was attracted to this car to-day by a Japanese girl dressed in the prevailing robes and colors of her country, who occupied the car and handed out folders describing the Paige line. A stripped chassis in the Paige exhibit has the appearance of having been sawed from end to end, only half of the chassis being shown and this has a mahogany finish. The stripped chassis of the Marmon looks very much as if those who were working on it had been suddenly called away, for only a part of the body is built, the idea being to show constructional feature of body design which could not be brought out in a finished body. Hupp shows the capital-to-capital car which visited the seat of government of every state in the Union during the fall.

Coliseum from the North Balcony. Note art gl ass panels along sides and detail of ceiling glob es. Chandeliers hung on cables are of yellow and green design with drops attached. The ba lls on the immense pillars are of a bronze and brown effect, the pillars of a darker shade of brown. The ceilings are done in a tapestry effect of a brown and fawn shade

As usual Overland holds the place of honor at the show by reason of its greatest production. It is on the right of the intersection of the two main aisles that divide the Coliseum from side to side and end to end. Immediately opposite the Overland exhibit at the right as one enters the Coliseum is the Studebaker exhibit the main attraction of which is the gold car which is a development of the gold chassis of a year ago. All of the visible metal parts of this chassis are gold plated and the body is finished in ivory with a leather-covered Victoria top. Buick holds its place at the left of the Coliseum center, having had this location for a number of years while Dodge has the other coveted corner formed by the two leading aisles through the Coliseum.

Much interest was shown in the new sixteen-valve creations of the year as exemplified in the Stutz and Drexel. The Stutz Bearcat now incorporates the sixteen-valve engine and is typical of speedster. The Mercer which adjoins the Stutz exhibit in the Coliseum annex is one of the few that is showing six chassis, most of the exhibitors confining themselves to five or less.

Only four cars that are absolutely new are making their appearance at the show and none of these offer anything radical in design, all being assembled from standard units. These four cars are the Stephens six, the Hassler, the Chicago light six and the Classic. Five cars are shown here that were not shown at New York these being the Glide, Maibohm, Monitor, Dixie and Woods Dual Power. Among the new bodies to be seen is the Scripps-Booth town car and the Anderson electric. There is one new model in the Ohio electric line being shown although this is only a modification of a previous design.

Accessory exhibits are much better arranged than in previous years, many of them being in cabinets which offer better

advantages of display. There are 168 accessory makers exhibiting, although there are very few new fitments that have not been seen at the New York show.

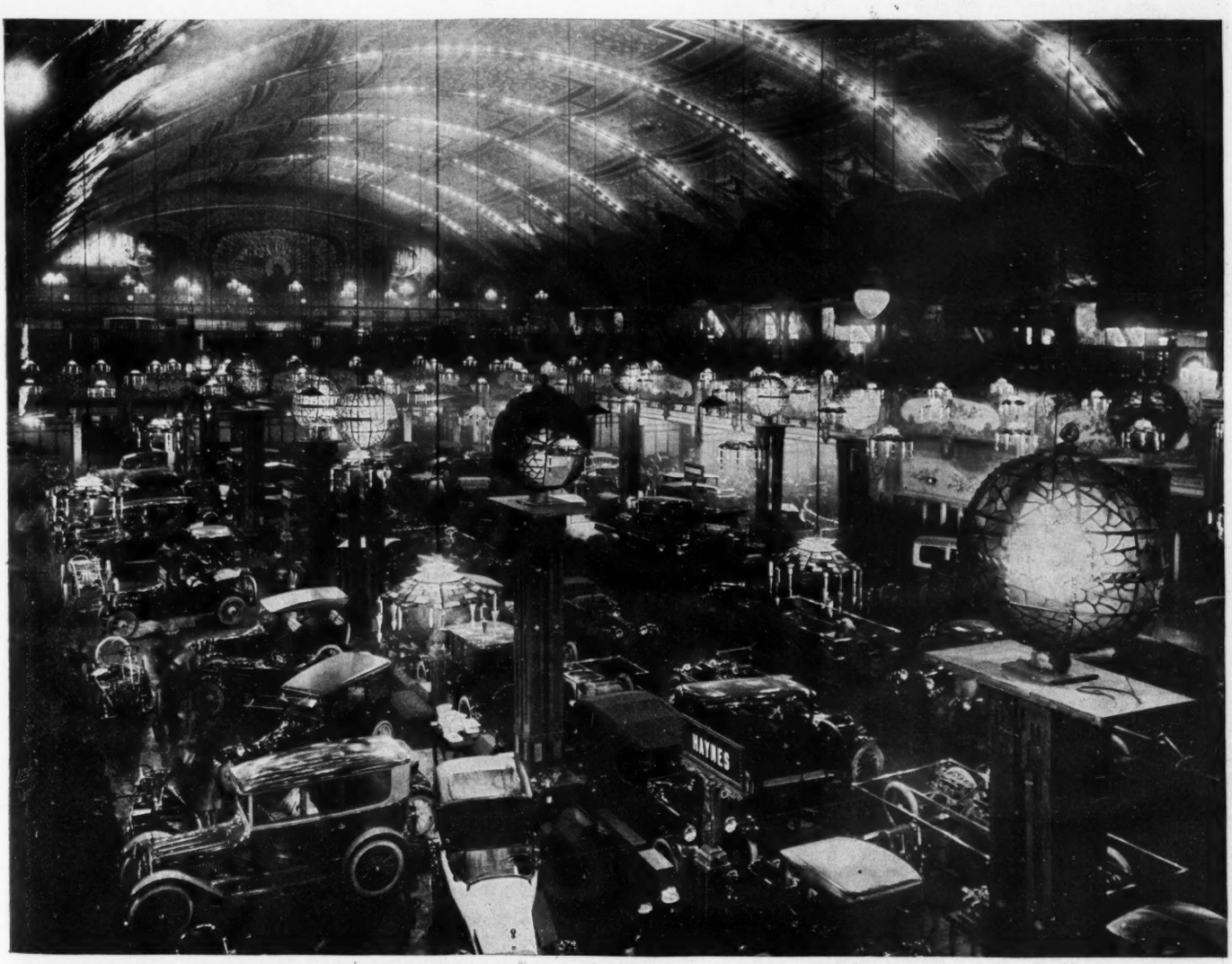
Users of wire wheels have increased materially since last year, fifty-nine of ninety-two car makers exhibiting showing wire wheels on one or more models. In the wire wheel equipment used, Houk leads as it did last year although by a greater margin. The number of makers using Houk wire wheels this year is the same as the total number using all makes last year or thirty-two, while the actual increase in those using Houk wheels over 1916 is nine. Last year those showing Rudge-Whitworth wire wheels at the show totaled four, whereas this year seven are showing this type of wheel. The Kelly and Hayes wire wheels which did not appear last year are used by makers this year to the extent of three and ten respectively.

Nipponese maid who graced the Paige convertible roadster

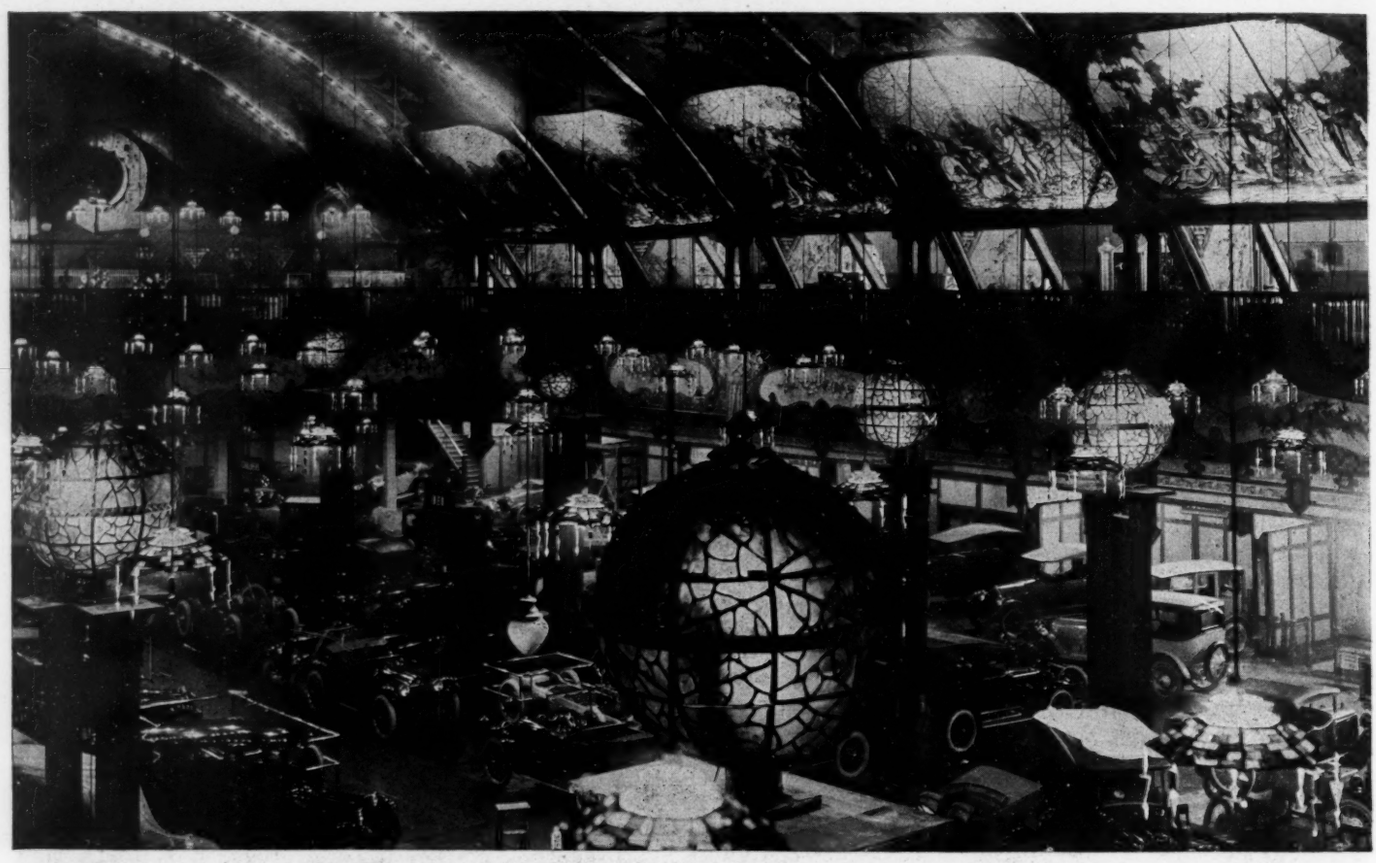
Four more makers are using cord tires on one or more of their models this year than last, Silvertown cords predominating with fifteen as against ten last year. Goodyear cords were shown by six exhibitors last year whereas only five were using them on their models exhibited this year.

Inquiry made of a number of exhibitors late to-night seemed to indicate that more business was done on the opening day this year than last and that the crowd, which is not usually considered the best on the first day, was materially better than had been anticipated. A number of dealers reported more live prospects for sales than they had ever known on the first day of the show. This was especially true in the Coliseum while those in the Greer building and the Armory were not so optimistic. It seems unfortunate that it is necessary to divide the exhibits and place them in different buildings. Several exhibitors in the Armory expressed the opinion that not more than one-half of those who visited the Coliseum took time to visit the Armory and pointed out that the scene at the New York show offered better advantages since all exhibits there are in one building.

(Concluded on page 43)

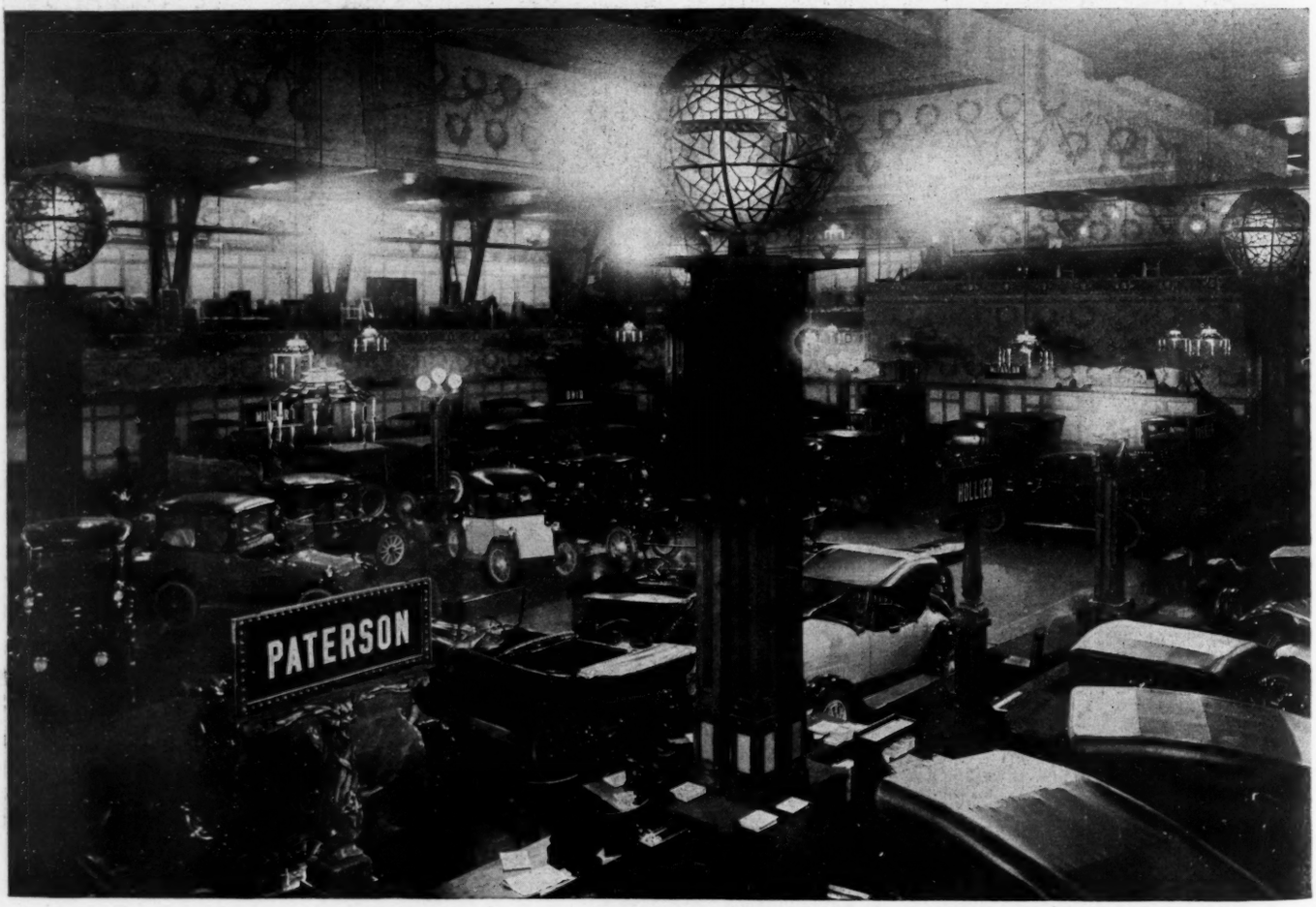


Main Coliseum, taken from N. E. corner of balcony

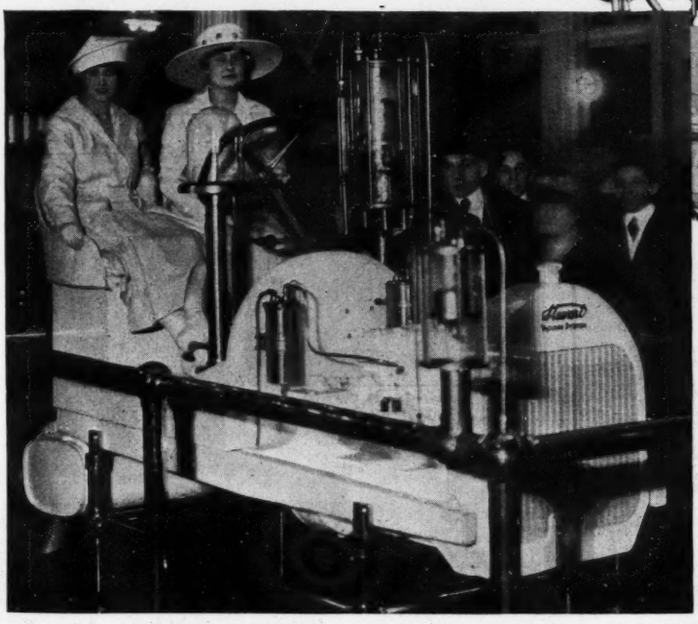


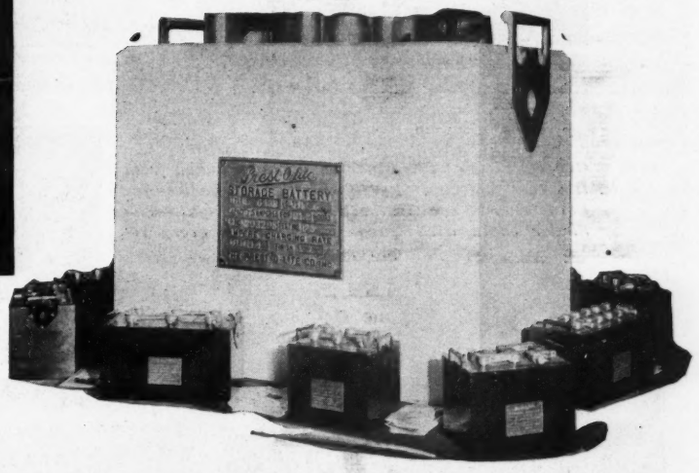
THE TWO MAIN EXHIBITION BUILDINGS OF THE CHICAGO SHOW

Above is a general view of the Coliseum from the west balcony, showing the art-glass effect panels symbolic of the industry. Below is a view of the First Regiment Armory, one of the overflow buildings



Show Corners That Were Crowd-Getters

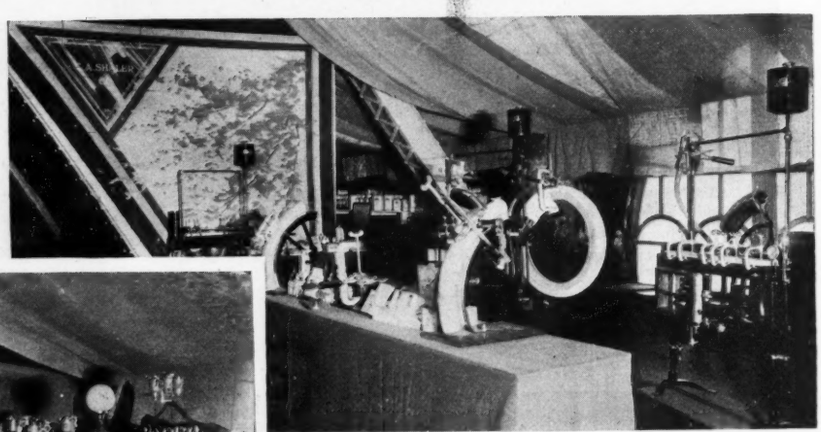




The two Stewart girls shown above installed art into an otherwise mechanical vacuum tank. Another corner of the gold and white display is shown in the upper right view. At the right is the huge white Prest-O-Lite battery with a row of its young brothers at its feet

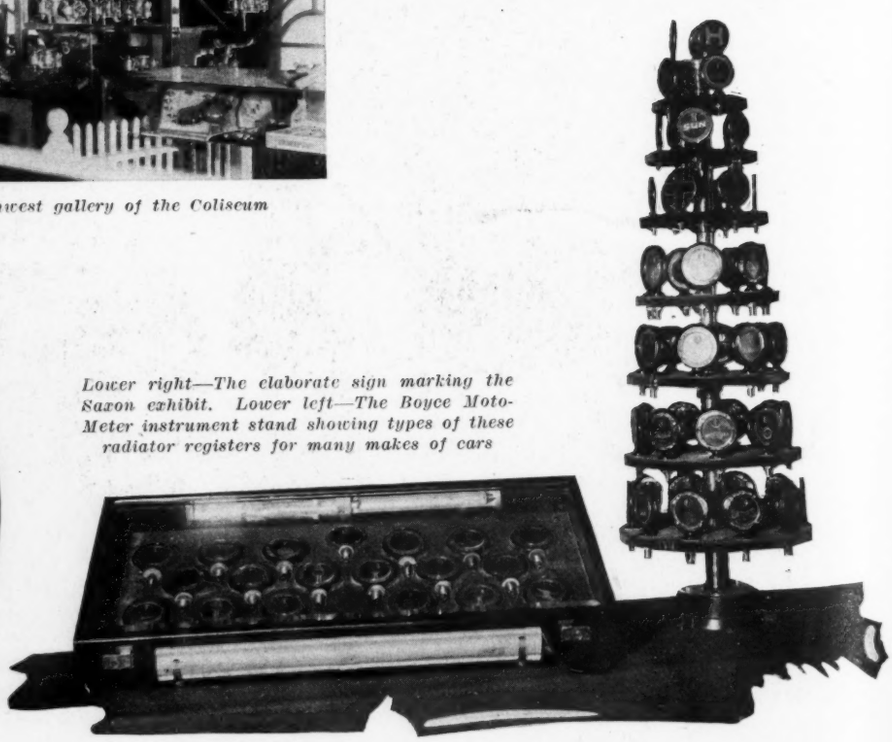
The Splitdorf electrical exhibit included a variety of magnetoes, generators, switches, starters and other electrical appliances. Motors were shown to display mounting of the electrical units

General view of the annex second floor taken from the east balcony. Parry commercial bodies for Fords may be seen in the foreground. Right—The Shaler booth with vulcanizers to meet every requirement



The Rayfield carburcter exhibit in the northwest gallery of the Coliseum

Lower right—The elaborate sign marking the Saxon exhibit. Lower left—The Boyce Moto-Meter instrument stand showing types of these radiator registers for many makes of cars



Tires Cause Much Power Loss

Efficiency of Engine Two-Thirds Eaten Up Between It and Rear Wheels

PHILADELPHIA, Jan. 25—Two-thirds of the power lost between your engine and the rear wheels of your car is caused directly by the tires. If you run your car with the tires inflated to 30 lb. when they ought to have 80 lb. in them, it takes 25 per cent more power to drive the car along the roads.

So get out your tire pump, motorists, for Professor E. M. Lockwood, head of Sheffield Scientific School of Yale University is authority for these statements. Professor Lockwood gave these somewhat startling figures in a paper before the Pennsylvania section of the Society of Automobile Engineers. His subject was "Power Losses in Pneumatic Tires."

Another important point he made was that these losses remain practically the same regardless of whether you drive 20, 30 or 40 m.p.h. And still another was that all this eating up of power is due directly to the flexure of the tires themselves as they roll over the humps and bumps in the roads. He proved this by calculating how much rise in temperature the absorption of this much power would bring about, which is about 37 degrees; and then he ran one of the tires half an hour at 40 miles an hour and measured the temperature with a thermometer. The test showed that the tire was just 39 degrees hotter than when the run was started.

Deductions

From this, Professor Lockwood deduces that what we really want is a tire that will bend and straighten out again without producing any more heat than a steel spring does. "For," he said, "if we can produce such a tire, a tire in which internal friction has been eliminated, we shall then have a tire that does not absorb any power."

The tests that Professor Lockwood made required the use of special apparatus, the car being mounted on rollers flush with the floor of the laboratory. The car was anchored and the rollers driven by a calibrated electric motor. By first determining the amount of power required, to drive the rollers with the car on them and carrying its normal load and then jacking the car up and determining the power required to turn the rollers alone, the difference gave the actual power required to turn the wheels of the car.

Some of the results are given in the appended tables, the first of these showing the figures from a series of runs made with a light six-cylinder chassis and with a heavier six-cylinder chassis. Professor

Underinflation Is Responsible for Heavier Load on Powerplant Regardless of Speed

Lockwood takes great pains to point out that the tests were not originally intended to determine the power losses in the tires, but that these figures were obtained and are now published because of their interest.

It should be noted in the accompanying table that the pressure in the cord tire was higher than that in the fabric tire, and for this reason the test is perhaps not quite as fair as it might be. Subsequent tests, however, do show that the rolling resistance of the cord tire is considerably less than that of the fabric tire, and furthermore that the rolling resistance of the cord tire does not increase nearly so rapidly with a reduction in inflation pressure as is the case with the fabric tire. This is well brought out by the set of curves given herewith.

From these, it will be seen that the fabric tire inflated to 80 lb. gave a rolling resistance of 30 lb. and when the inflation pressure was reduced to 30 lb., the rolling resistance immediately mounted to 45 lb.—an increase of 50 per cent. With the cord tire, on the other hand, the rolling resistance remains constant for pressures from 80 lb. down to 55 lb., and from here down to 30 lb., the rolling resistance increases only 2½ lb.

Similarly, the load carried by the tire has an important effect on the rolling resistance, for, the greater the load, the greater will be the flexure of the tire; and as Professor Lockwood has pointed out, the more flexure there is, the greater the heat generated and as it requires power to generate heat, this power is lost because the heat is dissipated into the air.

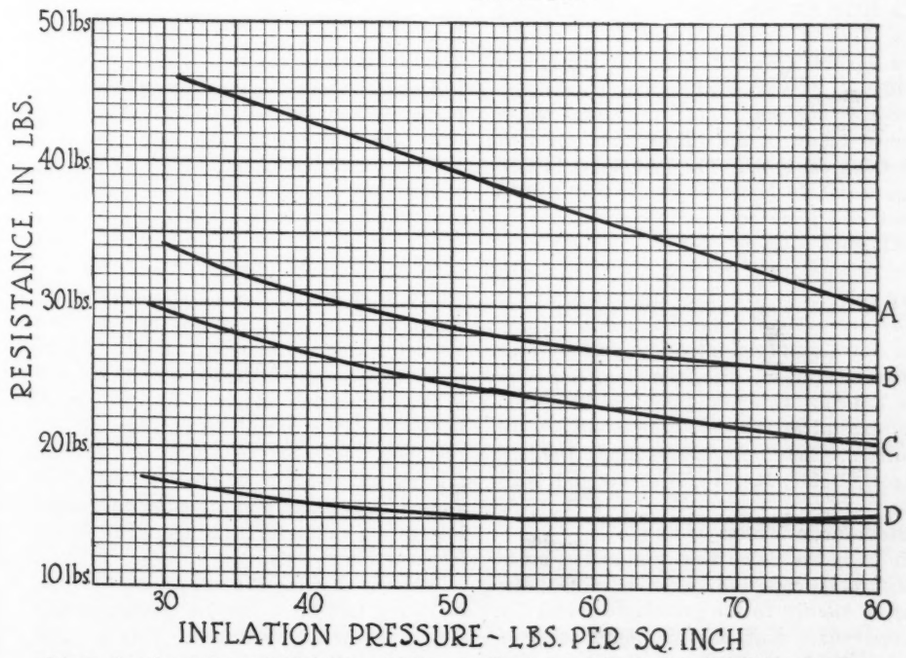
Summing up, Professor Lockwood says, "Only a limited number of tests of cord tires have been made under conditions permitting accurate comparison with fabric tires. The characteristics of the cord tire are: greatly reduced resistance loss and ability to run at low inflation without much increase of resistance. While these experiments point to the value of cord tires for reducing tire losses, more numerous and exhaustive tests are required covering a wider scope."

		INFLATION PRESSURE	MILES PER HOUR 20	30	40	AVERAGE
32x4	Cord	60	11.7	11.7	13.8	12.4
32x4	Fabric	55	24.1	23.3	24.4	24.3
35x5*	Cord	..	33.0	33.6	33.8	33.6

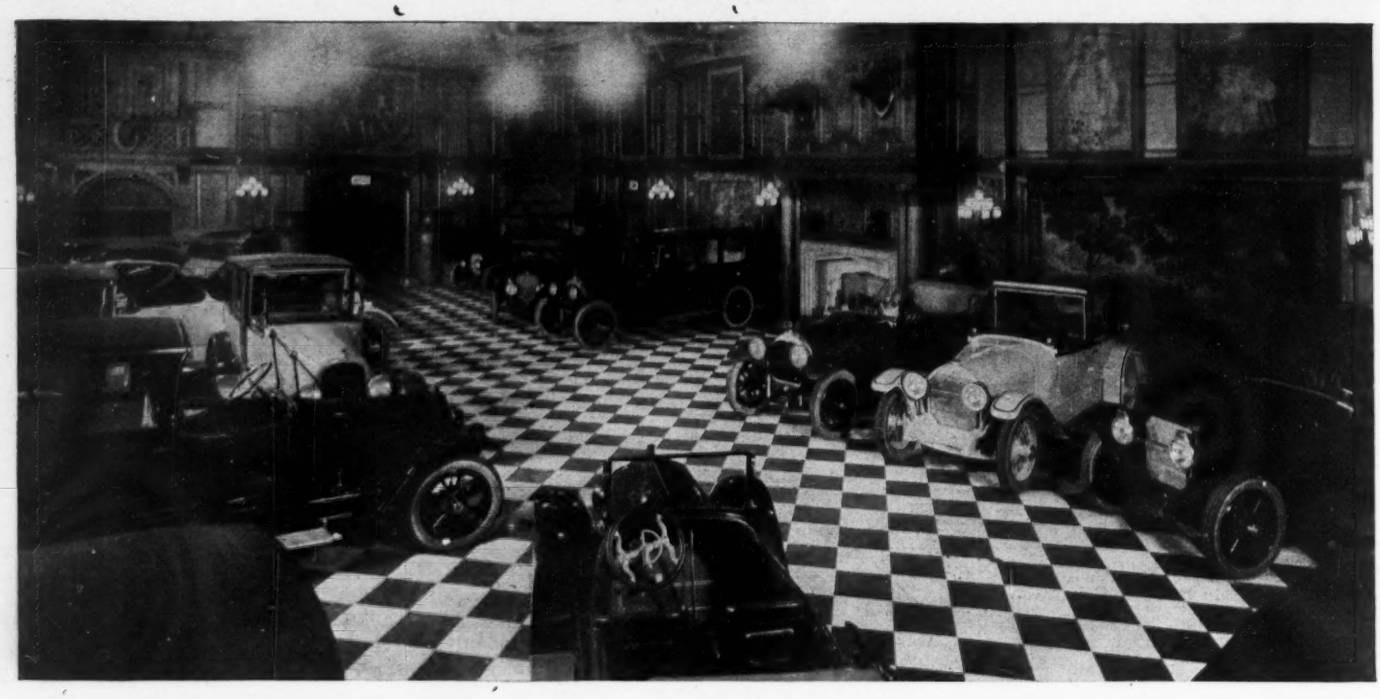
POWER LOSSES IN 2700-LB. CHASSIS

	LBS.	PER CENT
Front Tires	18.2	31.2
Rear Tires	17.7	30.3
Front Bearings	4.7	8.0
Rear Bearings*	17.9	30.6
	58.5	100.0

*Includes transmission mechanism up to neutral gear.



Curve showing how underinflation of tires adds to resistance of traction. A—Rear wheels, fabric tires, load on each wheel 772 lbs. B—Rear wheels, fabric tires, load on each wheel 550 lbs. C—Front wheels, fabric tires, load on each wheel 570 lbs. D—Front wheels, Silvertown cord, load on each wheel 570 lbs.



View of the second Salon show of the Congress hotel. The Elizabethan room forms the setting for some of the elite of motordom, among the creations being the White, Simplex, Brewster, Lancia, Locomobile, Daniels, Fageol, Doble, Murray, Disbrow and Marmon

Eleven Exhibitors at Salon

Models Displayed Embody Exclusiveness in Body Design—First Show of Kind Staged in Chicago Last Year Considerably Augmented and Probably Will Become Fixture

By Darwin S. Hatch

CHICAGO, Jan. 29—For the second time, Chicago this year is following New York's example in staging an exhibition devoted chiefly to a few of the higher grades of cars to disclose the more exclusive body designs. This is the Salon, which opened today in the Elizabethan room of the Congress hotel. The first Salon in Chicago was held last year at the Auditorium hotel and gave such evidence of a well-established demand for exclusiveness in cars in this territory that the annual display coincident with the larger show at the Coliseum probably has become a fixture. The Salon was originated last year by four manufacturers—White, Simplex, Brewster and Lancia. This year there are eleven exhibitors, all of the first four included. In addition, there are Locomobile, Daniels, Fageol, Doble, Murray, Disbrow and Marmon.

Custom-Made Bodies

It is at the Salon that the custom-made body has its opportunity for individual display in answer to the growing demand for exclusiveness that has prompted some of the largest dealers throughout the country to fit special bodies to stock chassis. Prices for cars at the Salon naturally are higher than those same cars with the stock body. The maximum is the new Fageol, in which the chassis sells for $9,500, and with its elaborate touring body is priced at $12,000. The real spirit of the Salon, however, is best represented in those cars having well-known chassis with bodies that represent the individual craftsmanship of some special body builder.

Of the cars on display, there are two which were not in the older Salon in the Astor at New York. These are the new Fageol, which is described on other pages, and a new speedster designed by Louis Disbrow, the racing driver. In the special bodies, C. P. Kimball is showing several custom-made jobs, including a striking touring car with a number of ingenious and novel features and a landau with some interesting characteristics, mounted on the Doble steam chassis.

White is showing the same line of bodies, including two limousines, a cloverleaf and a touring car all by Rubay. This is quite similar to the line shown in the East, but the colors are somewhat different.

The Salon is a very domesticated exhibition. There is a Lancia there to give a foreign touch, but this is obviously a chassis that has not lately arrived in the country, although it represents the latest practice of the factory. It has the hand brake outside of the body, for instance, a detail, but one which illustrates antebellum practice.

Disbrow's car, which is the real new thing at the Salon, is entirely a speed design and is shown in a special aluminum body made by Disbrow in his Cleveland plant. There is very little to the body besides the hood over the engine and a pair of racing seats. The bodies are made up individually to suit the size of the purchaser. A unique point is the employment of bicycle style fenders which turn with the front wheel so that although they are small, the driver is protected from the mud spray while turning a corner.

Disbrow Powerplant

The powerplant is a product of the Wisconsin factory, designed according to Disbrow's specifications. The car is furnished in two models which are interchangeable in all respects and differ only in the engines. Both of these are Wisconsin T-heads with the cylinders cast in blocks

of two. The smaller one is 5.1 by 5.5 and the larger 5¼ by 7. They are made for high-speed work and have steel pistons with exceptionally light alloy steel rods. The crankshaft is a racing style made rigid and carried on three large main bearings with pressure oil feed for lubrication.

Although the difference in bore in the two motors is 0.15 in., the valves are the same size and are interchangeable. They are 2⅛ in. in diameter and are made from tungsten steel. The valve drive is conventional, being through helical gears with the cam layout somewhat similar to that used on racing cars. The cams approach the constant-acceleration type with a long dwell and a quick lift. The clutch is a Borg & Beck disk and the gearbox a three-speed Warner. There is no standard final drive ratio, as this is made up to suit the conditions under which the purchaser is to operate the car.

Axles Specially Cut

An American Ball Bearing floating axle is used. These are special axles cut directly from the billet for the car. In fact, the entire machine is practically hand-built and fitted throughout and, although an assembled car in the final analysis, the parts are in most instances special and designed to meet the high stresses of fast driving. The frame is a product of the Hydraulic Pressed Steel Co., and the wheelbase is 114 in. on both the large and small models. Both sizes carry 33 by 4½ tires and the prices are $3,500 for the larger car and $2,650 for the smaller.

The fittings and equipment are quite limited owing to the nature of the bodies. What is provided, however, is of high quality. The electrical equipment, including lighting, starting and ignition, is Bosch. Double ignition is used with two sets of plugs mounted on each side of the T-head engine. The carbureter is a Miller racing type. A speed of 80 m.p.h. is claimed for the smaller and 90 for the larger model.

Locomobile is showing a four-passenger roadster in cream with fine black striping. A green limousine and a cream-colored landaulet are also shown by the same concern. Simplex is exhibiting a cut-away polished chassis as well as an attractive six-passenger touring and a black limousine. The six-passenger body does not carry the extra seats concealed, but folded directly against the backs of the front seats. Brewster is exhibiting a red two-passenger roadster with red cloth upholstery.

There also is a four-passenger roadster in Brewster green which has a neat little feature in the way of plunger door locks which allow the doors to open when they are pressed. Green leather upholstery is used on the driver's seat of a Marmon landaulet made up by the C. P. Kimball company. The interior is finished in green plush.

The Fageol has adjustable front seats which slide back and forth to suit the occupants. It is fitted with a Victoria top which is lined with silk plush. The outside of the top is mohair. The floor coverings are also of silk plush over the mahogany floor boards. The ventilators in the top of the hood are striking and also tend to relieve the long line of the hood covering the Hall-Scott aviation engine housed within. The sales price of the engine alone is $5,400.

The Murray and the Daniels cars that were shown at New York are at the Salon. The former exhibits a green seven-passenger touring car and the latter a touring design painted white with mahogany trim.

BOSTON SHOW SPACE ENLARGED

Boston, Mass., Jan. 27—Boston's motor show is swelling to gigantic proportions and now it has been found necessary to add a third building. The main show will be in Mechanic's building, the usual place. There will be the Salon at the Copley Plaza for cars of $2,500 and upwards, and the overflow will be held at Horticultural hall farther along Huntington avenue, where there was an overflow previously.

The Boston Automobile Dealers Association did not want to have an overflow in the other halls, but so insistent were the late comers who wanted to be identified with it in some way or other that Manager Chester I. Campbell finally had to take it on. He left for Chicago yesterday where he will confer with some of the exhibitors.

Even though it was not generally known that Horticultural hall had been added there was demand enough to fill that place quickly. This will make the Boston show the largest in the country, it is claimed. A few years ago two halls were used, and there was much dissatisfaction because the big show got all the limelight. So this year the exhibitors were told what to expect before they signed up for space. One admission will admit to all three shows, and there is some talk of having the salon open without tickets, as it to be in the hotel building.

BALTIMORE SCORES SUCCESS

Baltimore, Md., Jan. 27—Baltimore's show, which closed to-night at the Fifth Regiment Armory after a five-day exhibition was the most successful in point of attendance, and sales and prospects developed of the eleven shows that have been held here. General Manager H. M. Luzius, of the show committee of the Baltimore Automobile Dealers' Association and the Automobile Club of Maryland, under whose joint auspices the event was held, declared that this year's show proved to be a bigger success than any of its predecessors, despite the fact that the night charge throughout the week was 50 cents for admission, double the usual night charge, the day charge being 25 cents. The only slight rift to mar the show from an attendance standpoint was that of Thursday night, always billed as "Society Night," on which occasion the custom has been to double the admission. The prevailing opinion that it would cost $1 to come Thursday night held back the evening crowd, although the afternoon crowd was very large. For the first time the buying began in the opening days of the show and a canvass showed many healthy sales, some of which were completed on prospects and others developed right at the show.

High-grade cars, all above $1,000, sold well, and big selling by lines above $2,000 were also made. The country dealers came to the city early and dealers having the entire state closed many contracts for the season. One distributor reported that for the first time in years his firm was able to get real money from their rural customers at show time for good size delivery orders for the coming year. This experience was typical of many of the other dealers. Not alone did dealers come from Maryland, but Virginia, West Virginia and the Carolinas had representatives in attendance.

This year for the first time the show was exclusively for passenger cars and fifty-three dealers were represented, showing 221 cars. More than 30,000 visited the show, the big attendance day being 7000, which was Friday, there being more paid admissions on that day than on Tuesday evening, the opening night—Automobile Club Night — when about 8000 passed through the gates. The attendance increased about 15 per cent over last year, despite the increase in the admission charge.

LANCASTER SHOW ATTRACTS 20,000

Lancaster, Pa., Jan. 29—Catering to one of the richest agricultural districts in America, the Lancaster Automobile Trade Association held its annual show here last week. Many sales were reported and the event on the whole was the most successful of any ever held by the association. Between 15,000 and 20,000 persons from this city and towns throughout Lancaster county saw the thirty-one makes of cars on exhibition. There were forty exhibitors including accessories.

Lancaster county is known for the wealth of its agriculture. At the present time the value of its farm property is variously estimated at $85,000,000 which if equitably distributed among the population would give every man, woman and child $500.

The tobacco crop is the largest in the county and is larger than all the other counties in the state put together. This crop heads all others in size and valuation and gives this city the distinction of being the largest tobacco mart north of the Ohio river. The value of the crop is approximately $4,000,000. Live stock products are about the same in value.

Cars within the $800 limit have struck a popular chord in the rural districts particularly, and the prospects at the show were numerous for such cars as the Maxwell, Overland and Ford.

Lifts Restriction on Harroun Stock

Michigan Securities Commission Allows Sale of Issue Under Conditions

DETROIT, Jan. 30—The Michigan Securities Commission has permitted the Harroun company to proceed with the sale of its stock in Michigan. Owing to the fact that the brokers handling the stock previously had not complied with certain provisions of the Michigan Blue Sky law governing the procedure of brokers in marketing stock, the sale of the issue had been checked. The present decision means that the stock will be again on sale in Michigan.

In making its decision the commission imposed certain conditions which have been accepted by the attorneys for the Harroun company. Briefly, the restrictions are that the $4,000,000 worth of stock in the hands of the officers of the company must not be sold until the company is able to pay a dividend of 6 per cent on the entire $10,000,000 capitalization. Legally expressed, the commission holds the stock in escrow until that time.

After the conditions are complied with the company may sell $1,000,000 treasury stock in Michigan, paying a commission not exceeding 10 per cent to the brokers handling it. Furthermore, all advertising regarding the sale must be submitted to the commission for its approval. The decision is the result of a hearing held before the commission at Lansing, the state capital, on Jan. 25.

KISSEL HAS TWELVE-CYLINDER

Chicago, Jan. 29—Considerable interest has been aroused among the trade here by the appearance of a twelve-cylinder Kissel. The car incorporates a Weidely twelve-cylinder engine with the regulation overhead-valve action. It has been shown privately at the local branch of the company and will be run through a number of severe tests before actually being marketed. The chassis is a larger one than that of the Hundred-Point six model, but conforms in a great many respects to the same design.

ILLINOIS MAY BOOST LICENSE

Springfield, Ill., Jan. 29.—It is reasonably certain that the license fee for motor cars in Illinois will be increased at the present session of the legislature. It is absolutely certain that an advance will be urged and it will probably be enacted unless the unexpected happens. At a recent meeting of the Illinois State Highway Association, held in Danville, a resolution was adopted favoring an increase, especially for the heavier and more powerful cars, the increased revenue to be applied in the building of new roads. S. E. Bradt, secretary, compared the Illinois fee with that of a number of other states, all being larger than that of Illinois. He believed that Illinois should ask the same as neighboring states.

Illinois is boosting a bond issue which will improve 4,000 miles of roads. Every additional dollar that can be raised means better roads for the people who own motor cars. As they are most urgent in seeking improved highways it is argued that they should be willing to pay for them. It was pointed out that every mile of improved roads means a decrease in the expense of operating a car. With good roads a trip of 150 miles might be made on approximately 20 gal. of gasoline. With muddy roads the consumption of gas would be 50 per cent greater. In a single trip of this kind a car owner would save the increased cost of his license fee.

McCLAREN HEADS RACINE RUBBER

Racine, Wis., Jan. 29.—H. L. McClaren former president of the Mitchell-Lewis Motor Co., has been elected president of the Racine Rubber Co., to succeed Stuart Webster, who resigned because of ill health. Mr. McClaren formerly was head of the rubber company, which at that time was owned by the same interests as the Mitchel, company. Recently the tire plant was purchased by the Ajax Rubber Co., Trenton, N. J. Mr. Webster will continue as a director and as treasurer of the company.

FAEH HEADS OSGOOD SALES

Chicago, Jan. 29—A. C. Faeh, formerly advertising manager for Baker R. and L. Co., Cleveland, Ohio, will become sales and advertising manager for the Osgood Lens and Supply Co., Chicago, February 1.

LIBERTY PRICES UP $100

Detroit, Jan. 26.—The Liberty Motor Car Co., will advance its prices on all models $100 on Feb. 1. The touring car on that date will advance to $1,195; close-coupled four-passenger roadster, to $1,195; the brougham to $2,450; and the touring sedan to $1,395. The company will add a Springfield body model about the middle of March. This car will sell for $1,795.

PREST-O-LITE TO INCREASE CAPITAL

New York, Jan. 26.—The Prest-o-Lite Co., at a special meeting yesterday, plans for increasing the capital stock of the company from 80,000 to 100,000 shares, making the amount of the stated capitalization $1,000,000, were ratified.

AJAX TO ISSUE NEW STOCK

New York, Jan. 26.—Details in connection with the purchase of the Racine Rubber Co. by the Ajax Rubber Co., having been concluded, application has been made to list an additional 62,000 shares of Ajax stock on the local stock exchange. Through the purchase of the Racine company the number of shares of stock of the Ajax Rubber Co. has been brought up to 142,000, or $7,600,000, out of a total authorized issue of $10,000,000.

At the annual meeting of the Ajax company, to be held in February, the board of directors will be increased from nine to fifteen members and the present retiring directors re-elected. The six new members that are to be added to the board are from Chicago and Racine.

DELCO TURNS TO AVIATION

Dayton, Ohio, Jan. 29.—The Dayton Engineering Laboratories Co., maker of Delco starting, lighting and ignition equipment, has turned its eyes toward the field of aviation. Dayton, being the home of aviation in this country, naturally is keenly interested in aeronautics and the Delco company has established what might be described as a clinic on aviation in the Dayton plant. A large room in which the temperature can be regulated to summer heat or zero is used and aeronautic engines have been put through tests and experiments with various types of ignition equipment therein. These experiments have been carried further by actual flying tests with the equipments so evolved.

BROWN-LIPE ELECTS OFFICERS

Syracuse, N. Y., Jan. 27—At the annual meeting of the Brown-Lipe Gear Co. officers were elected as follows: Alexander T. Brown, president; Willard C. Lipe, first vice-president; George W. Sponable, second vice-president; Arthur E. Parsons, secretary and general manager, and E. A. Hungerford, treasurer. These, together with H. W. Chapin, make up the board of directors. Mr. Chapin has retired from the general management of the Brown-Lipe Gear Co., to devote his entire attention to the management of the Brown-Lipe-Chapin Co.

BONDS FOR EVERY CAR OWNER?

Albany, N. Y., Jan. 26.—New York car owners will have to accompany their applications for registration with a $5,000 bond, to be approved by the secretary of state, if a bill just introduced in the legislature becomes a law, unless such owner shall state in his application that he is insured in an equal amount in an insurance company. This is to cover payment of any judgment recovered against the owner in the operation of his car.

FIGHT PROPOSED TRUCK TAXATION

New York, Jan. 27—Action was taken here this week by motor truck interests of the state protesting against the passage of a bill proposing a new schedule of taxes for motor trucks and buses. The new schedule will increase the fees from double to fourteen times the present charge. The protest is made on the basis that the com-

mission which formulated the schedule did not perform its duty under the law which created it in that the fees as proposed are not based upon the time of use of roads or of the wear caused on such roads, but simply on gross weight and seating capacity of buses, and that the present fees be continued in force until such time as a new commission be appointed by the state to determine a scientific basis of taxation, based on the road wear of all types of vehicles, including motor trucks, passenger cars and horse drawn wagons.

GEMCO GETS ANOTHER INJUNCTION

Milwaukee, Wis., Jan. 27.—A decision made in the United States district court of the eastern district of Wisconsin, orders the Shadbolt & Boyd Iron Co., Milwaukee, to stop selling Gemco bumpers as covered by G. F. Discher's patent. Mr. Discher is the head of the Gemco company.

LOUISVILLE COMPANY INSOLVENT

Louisville, Ky., Jan. 27.—The Kentucky Automobile Co., a Louisville concern, was named in an involuntary bankruptcy petition filed by creditors in the United States district court here this week. The claim is set forth that the insolvency of the defendant company recently was established when another creditor, Sam B. Weatherby, obtained a judgment for $450 on account in the circuit court and the sheriff advertised a sale of property to satisfy the claim.

SNOW LEAVES NASH

Kenosha, Wis., Jan. 29.—Fred A. Snow, for five years chief metallurgist of the Thomas B. Jeffrey Co., Kenosha, Wis., and its successor, the Nash Motors Co., has resigned to engage in business on his own account as a consulting metallurgist and to establish a commercial heat-treating plant in Chicago. He will leave Kenosha on Feb. 1.

MORSE CHALMERS G. M.

Detroit, Mich., Jan. 27.—E. C. Morse, who has been vice-president of the Chalmers Motor Co. for several months, is now general manager as well as vice-president. Mr. Morse was commercial manager of the E. R. Thomas Co., in 1907, and went to the Chalmers organization during its early years, having the management of sales until Oct., 1916, when he resigned that position to become vice-president.

EMERSON OLDS SALES MANAGER

Lansing, Mich., Jan. 29.—P. L. Emerson has been appointed sales manager of the Olds Motor Works, this position having been vacant since the resignation of Jay Hall last July. Emerson was the organizer of territorial divisions for the Racine-Sattley Co., manufacturer of agriculture implements and vehicles, and also for the John Deere Plow Co.

Texas Gets Greatest Federal Aid

New York Second, Pennsylvania Third and Illinois Fourth in Road Fund Distribution

WASHINGTON, D. C., Jan. 29.—The federal appropriation for the fiscal year ending June 30, 1918, of $10,000,000 to aid the states in the construction of rural post roads has been apportioned among the several states in accordance with the terms of the Federal Aid road act. In accordance with the provisions of the act, 3 per cent of the appropriation, or $300,000, was deducted to meet the cost of administering the act. The remaining $9,700,000 has been divided among the states—one-third in the ratio of area, one-third in the ratio of population and one-third in the ratio of mileage of rural delivery routes. The division among the states follows:

State	Sum appropriated
Alabama	$ 208,297.80
Arizona	137,027.04
Arkansas	165,378.20
California	302,127.84
Colorado	167,380.28
Connecticut	62,180.88
Delaware	16,368.74
Florida	111,952.54
Georgia	268,658.96
Idaho	120,927.00
Illinois	441,852.46
Indiana	271,495.24
Iowa	292,351.20
Kansas	286,414.80
Kentucky	194,943.82
Louisiana	134,949.32
Maine	96,903.00
Maryland	88,094.44
Massachusetts	147,701.90
Michigan	291,567.44
Minnesota	284,788.12
Mississippi	177,811.68
Missouri	339,440.82
Montana	196,574.38
Nebraska	213,541.62
Nevada	128,796.60
New Hampshire	41,993.24
New Jersey	118,425.36
New Mexico	157,475.62
New York	501,440.54
North Carolina	228,763.84
North Dakota	152,286.12
Ohio	373,810.84
Oklahoma	230,278.00
Oregon	157,374.74
Pennsylvania	461,288.34
Rhode Island	23,331.42
South Carolina	143,615.28
South Dakota	161,892.04
Tennessee	228,306.96
Texas	583,855.62
Utah	113,900.30
Vermont	45,688.94
Virginia	199,321.42
Washington	143,768.56
West Virginia	106,540.92
Wisconsin	256,722.14
Wyoming	122,393.64
Total	$9,700,000.00

This is the second apportionment to be made under this act. For the fiscal year ending June 30, 1917, the appropriation was $5,000,000. For succeeding years the appropriation is as follows: 1919, $15,000,000; 1920, $20,000,000; 1921, $25,000,000.

These sums do not include the $1,000,000 which is appropriated each year for ten years for the development of roads and trails within or partly within the national forests.

INDORSE COLORADO ROAD BONDS

Denver, Colo., Jan. 27.—The annual Colorado good roads conventions just closed went on record in favor of a bond issue of $25,000,000 to $50,000,000 for road extension; increasing the power and funds of the state highway commission, remodeling the state motor vehicle license law to provide part-year rates and other changes to encourage car-buying at all times of the year; getting passed a law to make travel safer on all the state's highways, and supporting all practical legislation and other activities for the welfare of motoring and good roads in general.

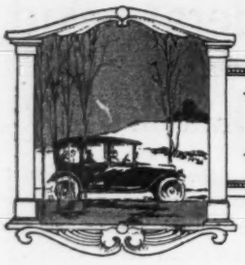
Charles R. McLain, Denver and Canon City, was elected to succeed Elmer E. Sommers, Denver, as president. Mr. Sommers held the office three years, and was again nominated for re-election, but withdrew. The new president has been active in good roads work for several years, and is well known as president and one of the organizers of the Rainbow Route Association, which has developed an excellent 370-mile highway across Colorado from La Junta to Grand Junction, through Pueblo, Canyon City, Salida, Gunnison, Montrose and Delta, crossing the main range of the Rockies at an elevation of 2 miles over Monarch pass, and penetrating some of the grandest scenery in the world.

AVERT FREIGHT CAR EMBARGO

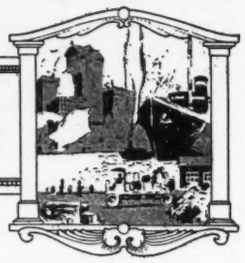
St. Louis, Mo., Jan. 29.—A threatened embargo on all freight for the St. Louis terminals, including shipments to the Southwest, probably has been averted by a drastic cleaning up. As a last resort the Alton bridge across the Mississippi 80 miles north of this city, has been opened to traffic after being closed several years. The Alton Terminal Association will handle southwestern traffic over this bridge. The first order to this terminal under the new routing was to collect 500 cars suitable for motor vehicles and send them to Flint, Mich., and Detroit, to carry to the Southwest shipments of machines that were waiting to be loaded.

WEIGHTMAN BANQUETS SPEED COPS

Los Angeles, Cal., Jan. 26—William Weightman, III, who won third place in the 1916 Vanderbilt Cup race at Santa Monica and is reputed to be a millionaire, is showing activity while wintering here. In addition to securing financial control of a theater, he is keeping to the fore in other ways. A few nights ago he banqueted eighteen motorcycle police officers in return, he said, for courteous treatment accorded him recently. He explained, when arrested for speeding on the county highway that he had a very important engagement to keep and through the intercession of the officers with the court he was let off with the minimum instead of maximum fine, as the speed of his car would have warranted.



EDITORIAL PERSPECTIVES



The Eternal Show

SO long as "hope springs eternal in the human breast," so long may we expect motor car shows of the Chicago kind to keep gaining in importance. It is the spirit of "to excel" that brings the thousands from the Valley of the Missisippi, and from beyond the mountains. Stop the spirit of change, quell the glow of enthusiasm, stamp out the flame of invention, and you can kill motor car shows. There is no better evidence of the spirit of progress in a people than their keen desire to follow the footsteps of the inventor and the engineer in their additions to science.

TO date the development of the motor car has been a mechanical romance without parallel. Never before has any other engineering movement got so into the hearts of the people. Every boy hopes to some day own a car. We hope that no boy or girl will reach their teens or pass through them without feeling the throb of motor progress.

THE motor car represents something more in this age than a mere mechanism. It is a permeating influence whose ramifications have no limits. The car represents a spirit of individual possibility as worthy of imitation as the deeds of our heroes. It represents not only personal and collective economy, but it stands for a higher goal of individual and national efficiency. Just as the telephone, the railroad, the steamship and the electric light stimulated the mental activity of continents, so today the motor car is stimulating the minds of millions. It is making millions think more quickly and more accurately; it is making millions work more efficiently; it is breeding broader visions of business in other millions; in short, the motor car movement is one whose influence is working in channels never associated with it.

THIS leadership manifests itself in one form in the present show, and the enthusiasts have been given a wider and deeper interest in this world, and we would not be overstepping the mark to add a greater interest in the next world and the great future. When too close to a great movement, you miss the perspective, and it will require centuries to write the true story of how much has been done to move this old world along the pathway of evolution by the motor car. It would be a task outside the sphere of any one individual.

Volatility, Not Gravity

IF gasoline makers and Washington officials have their way, the days are numbered when we will inquire as to the gravity of gasoline and another of our old idols will have been shattered. Instead of asking for gasoline of a certain gravity, we will ask for fuel of a certain volatility, or, to put it in other words, will ask for fuel of a certain distillation. Necessity always has and still continues to be the mother of invention, and while our mechanical and electrical engineers have been perfecting motors and magnetos, starters, spark plugs and lighting generators, our chemical or gasoline engineers have been burning the midnight oil in their laboratories. To us their names are unknown, but to our pocketbooks their works mean much.

THESE engineers have decided that what we know as Baume gravity means nothing; its usefulness was of yesterday. To say today that a gasoline is of certain gravity does not mean that it is easier to start with than a heavier gasoline. We may have a fuel of 60 gravity that does not volatilize so well in starting as one of 54 gravity. What does count is the percentage of relatively low temperature contents in gasoline. When there are enough of these low-boiling points, we are assured of relatively easy starting. It may be that in a few years we will not only specify the temperature of distillation, but ask for different percentages of fuel, just as today we ask for alcohol with different percentages of pure spirit.

ONE of the best results of the gasoline conference in Washington was that it brought business and government together mutually to talk over problems. There is no disputing the gravity of the fuel situation, and it is an indication of good progress when our government reaches out its hand and says to business, "Let us sit down and talk the subject over with our feet under the same table." Had we not had this get-together we might have had Washington writing some absurd gasoline specifications on the statute books. These specifications would have meant pay for inspectors to see that the fuel would measure up to requirements. Inspectors are very generally associated with possibilities of graft. By the get-together program all of these troubles may be avoided and money saved on all sides.

THERE are two sides to the gasoline argument; the oil men do not want the grade of gasoline hedged round with foolish restrictons, because restrictions generally mean reducing the quantity of gasoline that you can obtain from the gallon of crude. That is the one thing we do not want. It seems certain that heavier grades of fuel will have to be used, but this will not prove troublesome, particularly if our gasoline chemists retain enough of the low-boiling points so that the explosion of the charge can be quickly taken up.

SOME months ago MOTOR AGE urged a joint committee of gasoline men and motor car manufacturers, so that if a different grade of fuel had to be used, that due notice could be had of such and manufacturers given ample time to prepare for it. The meeting last week in Washington is a good start, and while several car and farm tractor engineers were present, the representation was not so large as the subject demanded. It is hoped this co-operative work will be continued. The motor, car, tractor and aviation engineers should join in the good work.

Fictitious Value of Used Cars

Difference of Opinion Between Dealer and Owner Ever Widening

Solution Found in Illinois—Auction Shows Sale Worth of Second-Hand Vehicles

THE problem of the used car is continually harassing the dealer in cars. The piano trade formerly had its problem in the old squares. Everybody wanted a new upright and many wished to turn in, as part payment, a square which if the owner was to be believed had, like a violin, improved in tonal quality during the years it had been in the possession of the seller.

The fact was, that nobody wanted a square piano and their worth to the dealer was only the value of the wood and other junkable parts. Thousands of these squares were destroyed by fire merely to get them out of the way.

The motor car dealers find that history is repeating itself. More than half the cars sold go to persons who are already the owners of cars, and these invariably find the intrinsic and sentimental value of the old cars remarkably high when a trade is suggested. The dealer, no matter how many new cars he can sell, cannot show profits if he loads up his garage floor space with archaic junk for which there is no market.

Car Depreciation Rapid

Dealers maintain that the depreciation on motor cars is rapid. A new car, if driven but 500 miles and no matter how good its condition, just for the reason that it has been driven, becomes a second-hand machine. As one dealer has expressed it, the success of some owners of second cars in unloading their junk on the dealers in exchange for new demonstrates that they are better salesmen than the dealers.

It is questionable if this depreciation is real. Too many it appears to be fictitious. The years 1909 to 1914 witnessed rapid and radical changes in car construction. Marked body alterations and the addition of refinements and accessories, were noted each year. Finally, motor cars became largely standardized and some well known manufacturers are even boasting that there should be no yearly changes of importance.

A few people will continue to buy cars for a single season, but most purchasers want machines that will give them four to five years' service. With such machines, there is no reason why many hundreds of dollars should be marked off their value as soon as the running gear becomes a little muddy.

On the other hand, cars that have seen long service, and given their owner his money's worth, may be expected to go directly to the junk pile. The motor car is no longer a plaything or luxury. The industry has become established and buying and selling methods have changed for the better. It is up to the dealers to get together for mutual protection, and standardize the value of the used car for their own protection. While some sales of new cars will be lost, the garages will not be littered up with unsightly and unsalable junk.

Dealers in Decatur, Ill., believe that the most effective method of convincing the owner of a used car of its actual value, is to induce him to attend an auction sale of this class. Finding it difficult to satisfy patrons who wish to purchase new cars and turn in their old, and who place an unreasonably high valuation on the latter, the Decatur dealers determined to get rid of all of the second hand cars on hand at a public sale, all to be sold regardless of the size of the bids.

The sale took place recently and demonstrated to the owners of old models just what their machines were actually worth when placed upon the market. It is freely conceded by the dealers throughout the country that they are the loser in the long run, because of too liberal allowances made on second cars in trades for new models, and some have reached the point where they will not take a used car in exchange on the sale of a new car.

Cars Put On Block

At the Decatur sale thirty-six cars were placed upon the block. There was a large crowd out and bidding was active, yet the average price realized was but $163 each. Most of the sales ranged from $107 to $175. Many of them, although having the semblance of being serviceable, would more properly be classed as junk. A two-cylinder Buick truck, brought but $45. A Waverly electric brougham, which had seen six years' service, brought but $50. A 1908 Welch touring car, brought $105. A 1916 Regal brought $400 and a 1914 Paige, $300. A 1913 Ford touring car brought $175.

Every sale represented heavy loss for the dealer who entered it, but they believe that the standard of values demonstrated, will be helpful during the coming year in handling buyers who place an absurdly high price upon their old car. It also will be helpful in its lesson to those dealers who have been too generous in their allowances and who have been so eager to make the sale of a new car, that they outbid a rival who was more nearly correct in the valuation.

The Decatur dealers are discussing a proposition to open a clearing house for second hand cars where they can be stored and sold at a price to be fixed by a board of appraisers. A disinterested agent will be in charge who will be allowed a commission for each car sold. This plan has been found successful in Rockford and other places in the West and may soon be adopted in Decatur.

CAR THIEVES USE MANY TOOLS

Nashville, Tenn., Jan. 26.—To be a regular motor car thief requires almost as large an equipment as it does to run a repair shop, according to local detectives, after arresting two young men charged with wholesale operations along this line. The two young men had in their possession, the detectives state, not only two Ford cars, but tools for chiseling off numbers, a dozen car licenses from various states and tools for removing various parts from cars. At least, this is the interpretation placed by the police on their equipment. They state that the numbers on the engines had been tampered with and the cars altered. It is believed that the cars were stolen in Indianapolis, and that a car stolen here was sold there. It is declared by the police that they are part of a band which has been working in this section.

"PLEASURE" CAR MISNOMER

The question has arisen as to whether or not the term "pleasure car" is not obsolete and likely to become injurious to the motor car industry, and manufacturers discussing this subject point out the wide and erroneous use of the words "pleasure car" even among some motor car makers. They declared that the motor car is no longer a vehicle bought or operated solely in the pursuit of pleasure. Quoting from one manufacturer:

"In the early days of the industry the motor car was a novelty and its use was confined to those seeking recreation or some form of pleasure, but with our economic development the motor car has ceased to be a plaything. It fills utilitarian purpose almost exclusively, and in many cases instead of being a luxury it is now an absolute necessity. The motor vehicle is either a passenger car or a commercial car, and should be so styled. It is a far cry from pleasure to the real functions of a passenger car, and the associations of the two long since outlived should not be perpetuated.

New Value Standard of Gasoline

Puts Volatility in Place of Gravity

Experts Agree that Old Term Is No Longer a Criterion—New One More Clearly Defines Ability of Fuel to Change from Liquid to Gaseous State in Certain Temperatures

WASHINGTON, D. C., Jan. 27—To-day witnessed the most unusual spectacle in the motor car industry—a large group of men in this city attempting to write the definition of gasoline. In this group were the greatest gasoline chemists in the country, the greatest government experts on the subject, leading motor car engineers, leading farm tractor engineers, and a host of others. They discussed for 12 solid hours, the subject of gasoline, and finally adjourned agreeing that it was impossible to write such a definition at the present time.

The meeting was called by the Bureau of Mines, and the Bureau of Standards, Departments of the Federal government, and all oil men were invited to attend. They responded generally, and this country has not seen such a determined and pertinent discussion on the gasoline question.

Legislative Definition Thought Injurious

At one time it was thought necessary to have the Federal government pass a law applying to the District of Columbia, defining gasoline, with the object of having this law copied in the different states. The oil men to a man, went against any such legislation, backed up by the argument that any legislation specifically defining gasoline would prove injurious in that it would reduce the quantity of gasoline produced from a gallon of crude. The oil men stood strong for no legislation of this kind within a year, and the meeting adjourned with that conviction in mind.

To-day's meeting was called for sundry reasons. The price of gasoline has been going up sufficiently in the last year to warrant an investigation. A still greater difficulty has been the country-wide abuse in marketing gasoline. Sentiment was general to-day that unscrupulous dealers, buying a certain grade of some well-known market brand, mix it heavily with kerosene and often sell at a higher price. This, combined with short measure, led the Bureau of Standards to make a wide investigation some months ago with the results that short measure and mixing were found to be too general.

One of the big deductions from to-day's meeting is that gravity is no longer a criterion of gasoline value as a fuel, and that a new word will have to be taken up, namely, volatility. Oil men agreed with the government specialists that the term gravity, which has been used for years, has entirely outlived its value. From this date hence we will use the word "volatility," which is meant the ability of a fuel to change from the liquid to a gaseous state at certain temperatures. It was pointed out by some of the oil men that a heavy fuel may be more volatile than a light one. Generally we assume that the heavier the fuel, or the lower the gravity as we have been accustomed to describing it, the harder it is to volatilize, but this argument was entirely disapproved from both sides.

This question of volatility instead of gravity, is bringing a new mathematical desideratum into the gasoline field, namely the volatilization curve. We are all familiar with the horsepower curve. We have become accustomed to charts and curves showing how food prices rise and fall over a period of years, or how the price of commodities vary, or how the grain production of the country goes up or down. To our stock in knowledge of curves we will now have to add the volatility curve, and when we stop for gasoline at the curbside we will talk volatility rather than gravity.

Freedom of Speech Prominent

It was a wonderful meeting, wonderful for its freedom of speech, and wonderful for the frankness with which everyone discussed the extremely difficult problem. The ambition of the joint committee of the two bureaus is to take some action which will make it easier for the user of a car to be sure that when he asks for gasoline he will get a liquid which will run his engine in a satisfactory way. At the outset, it might seem to be easy to say where gasoline leaves off and kerosene begins. It might seem easy to formulate a definition of gasoline drawn wide enough to admit of hydrocarbons which will run a motor car satisfactorily.

After 12 hr. continual discussion between the oil men and the bureaus, it appears that a definition of gasoline is going to be almost impossible to make. The chief reason for this is that nobody, neither oil man nor motor car engineer, is at present able to say what gasoline ought or ought not to contain. There are just two things which are certain about it. Taking the engine of to-day, the fuel for it—1—must contain some proportion of highly volatile spirit, to allow it to be started. 2—It must not contain more than a very small proportion of spirit with less than a certain degree of volatility.

But practically nobody at the conference was able to place any definite mark on these limitations.

In order to understand the situation it is necessary to appreciate the meaning of a volatilization or distillation curve. In testing gasoline a small measured quantity is put in a flask and is boiled away, the vapor being condensed and led to a graduated measuring glass. In the neck of the flask is a thermometer and the accepted method is to observe the temperature at which successful proportions of the liquid have been boiled off. For example: The temperature may be read when 20 per cent has passed over into the condenser, again when 50 per cent is gone and again at 90 per cent. Finally, as the last drop in the flask vanishes, we reach the "dry point" or "end point" where the temperature again should be observed. The temperature when boiling first starts is known as the initial point. A pretty good gasoline in the ordinary sense of the term would be something as follows: 25 per cent boiling off before reaching temperature of 225 Fahr., 50 per cent boiling off before reaching a temperature of 265 Fahr., 90 per cent boiling off before reaching a temperature of 340 Fahr., dry point, 400 Fahr.

High Dry Point

Now there are very few gasolines on the market to-day with a dry point as low as 400; 450, which is well in the kerosene range, is quite usual. Dry points up to 500 are not uncommon. Furthermore, these high dry points can come in gasolines and be satisfactory in use. At present the engineers cannot say how high a dry point they are prepared to cope with. They cannot say how low an initial point they want. They cannot say whether they want a curve which runs up very quickly and then goes along pretty nearly parallel to the base line, or whether they want a curve ascending in a smooth slope from the initial to the final temperature. The oil men apparently cannot help them.

There is a very great deal to be said in favor of a definition of gasoline made by a specified distillation curve limits, for a fuel such that it will operate satisfactorily in a present-day engine. The engines of the future are going to burn almost anything in the way of liquid fuel.

It will be a very short time before the passenger car which will both start and run on kerosene, is at least as common as the gasoline engine. At that time what is to-day good gasoline will still be required to run the 3,000,000 cars now on our roads. The other machines, according to their degrees of ability, will be satisfied by 80 per cent, 60 per cent or 40 per cent gasoline mixtures. It would be quite easy to handle gasolines in this way just as alcohol is handled commercially. Nobody ever sees pure alcohol. It is always sold in mixtures with so much per cent alcohol and so much water. We can do just the same with gasoline. A motor car manufacturer could advertise his car to operate on say 50 per cent gasoline, and the chances are that if gasoline were defined to-day next year or the year after dealers would have in stock a little 100 per cent gasoline and a large quantity of 60 or 70 per cent. By this means it is argued the motorist would be able to know what he was buying.

Revise Definition Annually

Another recommendation is that a definition be established with a proviso that it be revised from year to year as occasion demands. The great cry of the oil men is that if any recommendation is placed on what is gasoline it will limit the amount of suitable motor fuel which can be produced from the wells. They also seemed to hold a general opinion that if a dealer has two grades or rather is selling at two prices, the majority of people will buy the dearer liquid. No positive evidence was produced in support of this somewhat extraordinary claim, yet it was again and again stated that a dealer who had gas at two prices sold most of the dearer quite without regard to the respective qualities. At the same time it was agreed that what the motorists want is the cheapest possible fuel which will run his car. This was stated over and over again and flatly contradicts the other statement. It would seem likely the truth is the average man is anxious to get the cheapest fuel possible and believes that by paying a higher price he will get something which will make starting easier.

The big difficulty with gasoline is the large number of opportunities for adulteration which occur between the refining process and the time when the liquid goes into the tanks of the motor car. From the refiner the gasoline goes to the jobber who buys from different sources and probably mixes different sorts by dumping different carloads in the same main tank. The jobber has the opportunity of adding to the gasoline something which he buys under a different name, such as kerosene or distillate. He may do this and yet produce a perfectly satisfactory fuel. There are gasolines on the market to be bought at the refineries which are actually improved by the addition of kerosene.

From the jobber the gas goes to the tank wagon and a dishonest teamster has ample opportunity for adulterating the liquid it is his duty to deliver to the retailer. Six drivers in Detroit were recently caught making a fifty-fifty mixture of the jobber's gasoline and kerosene before delivering to the retailer. Finally, the retailer can again blend or mix just as the jobber can.

Here comes a very crucial point. If the refiner supplies Blue Moon gasoline, the jobber who handles this or the retailer or anyone else who adds anything to it is guilty of fraud, if from refinery to private motorist, the product is sold as Blue Moon gasoline all along the line. If, however, either jobber or retailer buys Blue Moon gasoline, mixes something with it and sells it as Pink Sun gasoline he is not guilty of any fraud whatsoever.

It was reported to the bureaus by many of the speakers that a regular habit among a certain class of dealer is to buy a proprietary brand of gasoline and sell it at the marked figure, say 18 cents, under its own name. They will take some of this, debase it by kerosene additions and sell it under some fancy name of their own at a cent or two a gallon more and the motorists buy the dearer product under the impression that it must be better. This, of course, is plain dishonesty, yet it is a kind of dishonesty which few laws exist to stop. That it must be stopped somehow or other is obvious. Just how to stop it is at the present moment up to the Bureau of Mines and the Bureau of Standards, but from their two-day session with the oil men and other interested parties they obtained very few concrete suggestions.

Adulteration of Gasoline

From all over the country comes the cry that gasoline is being adulterated, that what is being sold now makes starting very difficult and provokes rapid carbonization. Throughout the country legislatures, both state and municipal, are drafting bills to regulate the sale of gasoline. In a number of districts there are already laws in existence. Nearly all these legislatures are appealing to Washington for guidance, are appealing to the Bureau of Mines and the Bureau of Standards to give them a rational basis for a law which will protect motorists from fraud, which will insure that when a man buys gasoline he gets what he wants, even although he is incapable of describing in scientific detail just what it is that he does want.

At the same meeting were representatives of states and cities, who, with one accord, declared that whatever Washington might decide to do, in their respective districts there would be laws.

To this the response of the oil men is, if there must be laws let them be uniform laws and let the aim of legislation be not the definition or specification of gasoline, but let it be something to prevent the sale as gasoline something which is not gasoline, as the term is ordinarily understood in commercial circles at the moment. The oil men will all support a legislation which will allow the refiner to sell gasoline of any specification and will insure that the retailer delivers to his customers that selfsame liquid.

They will oppose a law which places any limitation upon what the refineries may sell in bulk as gasoline.

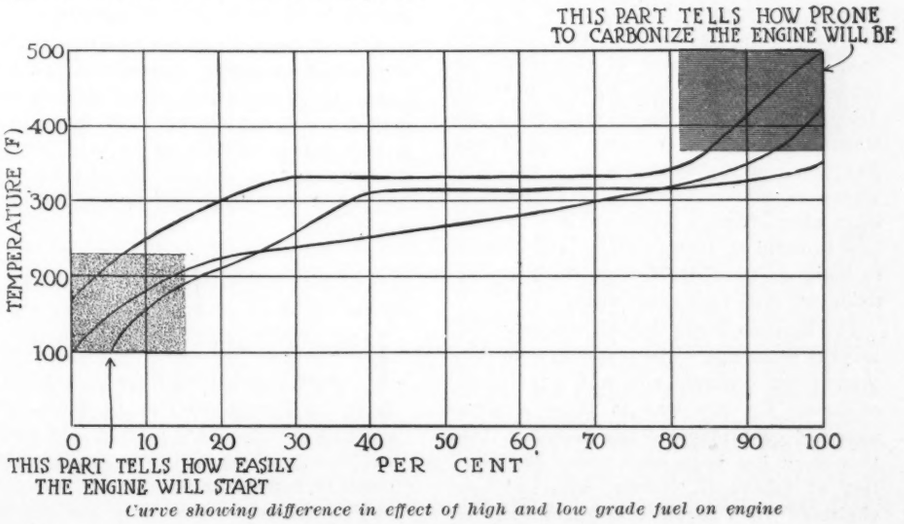
This sounds a very unjust thing, but it is in truth by no means what it sounds. In the last few years gasoline has grown steadily less and less volatile, and this decrease in volatility will continue in all probability through future years. This gives us an alternative.

1—We may make a definition for gasoline with sufficiently wide limits to cover all the satisfactory kinds on the market to-day. If this is done the chances are, in a year or in two years' time, 100 per cent gasoline, according to that specification, will not be obtainable.

2—We may legislate to inforce the sale by the retailer of what the refiner likes to call gasoline. This means that from year to year the volatility of gasoline would decrease, but its average composition throughout the country probably would be fairly even on any given date.

As a method for starting the meeting and obtaining a basis for discussion, the joint committee of the Bureaus of Mines and of Standards suggested three possible

(Continued on Page 25)



Curve showing difference in effect of high and low grade fuel on engine

"MOTOR AGE offers no apology to its readers for the following pages on the question of our foreign trade as presented at the annual convention of the Foreign Trade Council in Pittsburgh last week. In these days, when preparedness is on every tongue and every patriotic citizen is looking to the days following the signing of peace, it is high time that all citizens, whether in the motor car industry or not, familiarize themselves with questions of government relating to this question.

"The mere reason that we are not manufacturers and that we are not in anywise connected with foreign trade is no reason why we should slight it. It is the big, pertinent question of the day. It will be a still more important question in the days following the signing of peace.

"Too few of us realize that foreign trade is part and parcel of our political system. Today the three big factors handicapping our foreign trade are political questions, and, being such, each voter has a say in the solution of them.

"These questions are: A merchant marine or some reconstruction of our shipping policy; some legalization of co-operation in selling our articles abroad and which is not permitted now because of the Sherman act; and, lastly, a bargaining tariff which will enable our government promptly to meet any increase in import duties by any of the belligerents or European neutrals.

"Motor Age is convinced that these questions are sufficiently pertinent to lay before its readers, and invites most careful consideration of them as well as the most active support in their behalf."

The Three Essentials

By David Beecroft

PITTSBURGH, Jan. 27.—That American manufacturers in all lines of industry are extraordinarily interested in export trade and are also interested in what foreign trade conditions the United States is going to face when the war closes was demonstrated at the annual convention of the Foreign Trade Council, a government and business organization, at its fourth annual convention held in this city for the past three days. Over 1250 delegates from all of the states of the Union attended. A special train brought over 150 delegates from the Pacific coast, and a contingent of over fifty came from Texas. Nearly all of the delegates were manufacturers in all lines who were anxious to learn about foreign trade, anxious to learn how to build up foreign trade, and anxious to learn as to what kind of trade competition we will face after peace.

The Foreign Trade Council was organized several years ago to be a common meeting ground for business men and government officials. Its aim was to bring business men and government closer together. That this work has been done under the direction of Edwin N. Hurley, who has been chairman of it for several years was best attested to by the 1250 delegates as compared with less than 400 delegates at the convention in New Orleans just about a year ago.

The motor car industry was not so well represented as it should have been. Perhaps a dozen car companies and a score of accessory concerns had their export managers present. The convention deserved twice as large representation.

After 3 days of speech making, reading of special addresses, discussions and banquets the convention voted unanimously that three broad achievements have to be scored before it will be as easy for our business men to carry on export trade as it has been for many firms in European countries.

1

FIRST: It will be necessary to have more ocean-going ships to carry our trade to foreign shores; in short, we must have a merchant marine. At present our goods are being carried too much in foreign ships. It was brought out in discussion that only one American boat has cleared from the Port of Galveston, Tex., in two years in foreign trade. The foreign trade of that port has largely been handled by the Japanese. To show to what extent our foreign shipping in American boats has suffered of late, Capt. Robert Dollar of the Robert Dollar Co., San Francisco, told how before the war our ships had carried 26.10 per cent of the total tonnage on the Pacific ocean, but that today our ships are carrying only 1.97 per cent of the Pacific ocean tonnage. On the other hand Japan before the war was carrying in her ships 26.05 per cent and today is carrying 50.90 or slightly more than one-half of the total Pacific tonnage. While Japan has doubled we have been cut practically to nothing.

In spite of being at war Great Britain has increased her shipping in the Pacific. Before the war she carried 29.38 per cent of the total Pacific tonnage and today is carrying 37.09 per cent of it.

Our loss in ocean tonnage is laid to legislation which has been generally interpreted as being more favorable to foreign ships than to our home ones.

2

SECOND: It will be necessary for U. S. A. manufacturers to be permitted in some manner or other to co-operate in selling our exports in foreign fields. It transpires that co-operation has been one of the big reasons for rapid pushing of foreign trade. Germany, in particular, has permitted and encouraged all forms of co-operative effort among her manufacturers and merchants. At present co-operation among our manufacturers for foreign trade comes under the regime of the Sherman act, and it is not certain whether the government could not proceed against a combination of three or four concerns that banded together for export. What we need then is some legalized method of co-operation in the foreign field, and for this purpose the present Webb bill is before the Senate. It has been up for consideration in Washington for three years.

It has already passed the House of Representatives, and it is hoped to put it through the Senate before March 4. Its adherents are working hard for it and no doubt will be victorious.

The Webb bill aims at the simple goal of permitting any number of makers to work together in their export trade. They may unite and have one man handle their various lines in foreign lands. They may form some corporation for export trade only. The reason for this necessary co-operation lies in the fact that it is too expensive for many small manufacturers to carry on their own export work; too expensive to send their own salesmen to different foreign countries. European countries have for years worked in this co-operative way.

Such countries as Germany in particular and England also, have organized large selling firms in foreign lands who handle hundreds of different lines. Thus we find both English and German department stores in different lands, these being organized primarily as good methods for introducing and selling the merchandise of the respective

3

THIRD: The convention decided that a third broad essential to foreign trade is that the U. S. A. secure certain tariff changes. At present we are working under a low schedule of import duties and have not the power to raise the schedule, but have the power to lower it. After the war the entire tariff fabric of Europe will be changed, in fact, is being changed today, and in order to compete with European countries it will be necessary for us to have what is known as a bargaining tariff with power vested in the president to raise tariff schedules with different countries as necessary. At present our tariff is barren of any possible bargaining ideas.

With these three major considerations accomplished the 1250 delegates voted that it would be much easier for our motor car makers, accessory makers, truck makers and all manufacturers to progress in foreign trade.

The New Europe

THE convention brought out some very pertinent facts with regard to our present position with European countries, particularly those engaged in the war. In this respect the generally accepted condition of Europe when peace is signed was that it will be a new Europe, a Europe of efficiency, a robust Europe, a Europe trained to act in concert, and not a war-crippled, maimed and worn-out Europe. Europe has progressed more in the last thirty months in great lessons of co-operation and efficiency than she did in the previous thirty years. This opinion was generally shared by all delegates present. Trade commissions recently returned from France and England have told of the new Europe.

Europe after the war, or the new Europe, the co-ordinated Europe, the efficiency Europe came in for general comment at a score of different times during the convention so the unanimous consensus of opinion is that all Europe will emerge from the war as a young athlete after his weeks of hard training for the final football game or for the annual athletic meet. It will be no weakened Europe, but a Europe filled with men hardened by months of physical training and outdoor life, and a Europe breathing through every pore the lesson of co-operation.

Louis E. Pierson, chairman of the Irving National Bank of New York city, speaking on American banking and foreign trade sees Europe after the war stronger financially and better equipped for world trade than before the war. Here is how Mr. Pierson puts it:

"Europe of the future will hold no less powerful influence in the world of finance than did Europe of the past. We dwell too much on the idea of a war-devastated, war-scarred, helpless Europe, and we have been unable to see the other Europe, the Europe of aggressiveness and power, which after the war, will face the world, a better customer, and a more dangerous competitor than ever before."

Comparing the United States with the various countries of Europe, Mr. Pierson called attention to the very general co-operation between the government and business in nearly every country, whereas such co-operation has been hopelessly lacking in our country. He said:

"In nearly all Europe throughout every complexion of government, all the way from socialistic Denmark, through the various republics to intensively bureaucratic Prussia, there has been evolved a uniform, well-defined, nationally accepted theory, controlling all the essential relations between government and business. The importance of the result hardly can be exaggerated. Every resource seems to have been fashioned into a common national weapon, to be employed in the interest of either business or government."

IT must not be inferred that it is impossible for any U. S. A. merchant to build up foreign trade under present conditions, far from it; but it is conceded that our merchants are not working on an equal footing with foreign merchants because of the three handicaps referred to.

Contrasting our government with European governments in this respect, Mr. Pierson continued:

"In the United States the situation is almost entirely otherwise; business is disposed to view government as a more or less respectable policeman, and government is disposed to view business as a more or less dangerous malefactor. Each appears willing to concede to the other the possibility of merit, but neither appears willing to concede sufficiently to make it possible for both to get together upon the perfectly obvious theory that their interests are identical."

The question of conditions in Europe after the war was handled by W. W. Nichols, who was chairman of the American Iudustrial Commission to France, which spent forty-five days last fall studying the field of destruction in France and looking into the question of which reconstruction work will have to be done in France and Belgium when the war is over.

Mr. Nichols told of the zone of destruction which in France alone includes 750 towns, and in addition four cities of over 100,000 population each. But great

as the work of reconstruction may be in the war zone, Mr. Nichols believes that it will be exceeded by the work of reconstruction through all of France. He told of how the Touring Club of France, a motoring organization for the distribution of touring information, in co-operation with the hotel associations and other organizations, plans to spend $100,000,000 in the general rehabilitation of the resort hotel system; he told of plans that will call for 17,000 farm tractors such as our tractor makers are now producing for farm work; he told of the need of 125,000 farm plows, many of which will be used with gasoline tractors; he told of the enormous demand for other farm implements, not specifically mentioning motor trucks; he told how $75,000,000 to $100,000,000 will be needed in new textile machinery; he estimated that $600,000,000 will be needed for the replacement of industrial property in the war zone alone.

Long-Time Credits

Mr. Nichols believes that after the war France will require long-time credits, but he believes that caring for these credits is rather a question to be handled by our bankers than by our manufacturers. He feels that there is no danger of financial losses conected with such long-time credits because the French national character is founded on an innate repugnance to bankruptcy. Bankruptcy is considered a disgrace in France, and so there are few dangers connected with credit extension to that country.

It was voiced by C. H. McIntosh, vice-president of the Bank of California, San Francisco, that we should not be misled by the fact that so much gold has come to us since the war. Mr. McIntosh claims that it is not to our advantage to drain gold from other countries to our coffers; and that our interests in the soundness of financial conditions abroad are second only to our interests in the soundness of financial conditions at home. Mr. McIntosh charged us with being too selfish in our foreign trade, and of lacking a national comprehension of the questions of foreign trade and how to solve them. We have as individual firms traveled too much on our individual roads and have forgotten the broad road of common travel so pursued by many foreign nations. We must cultivate a broader view of foreign trade and learn to think of the whole rather than the parts. We should learn that in foreign trade our individual interests are advanced by team work, just as in a baseball or football game.

Mr. Pierson touched on one of the biggest questions in connection with finance and foreign trade when he took up the problem of the huge loans which we have made to belligerents. The value of these foreign loans is great. These loans are really the guaranty of credit to the belligerents to enable them to buy from us and pay for, under reasonable conditions, the products we have to sell. All European countries will meet all of these obligations. There is not a symptom of doubt as to this. The Europe of the future will wield no less powerful influence in world finance than did Europe of the past. The financial center of the world has not been moved across the Atlantic because of these loans and the war. Mr. Pierson continued on this subject:

"The new Europe of the future, viewed as the basis of foreign loans, is entirely sound. In both disposition and ability its position as a foreign debtor may be built upon with safety. It will pay its foreign debts, protect its foreign credits, redeem its foreign pledges, and for the best reason in the world, self interest. Its credits must not be impaired. Countries like France and England, whose financial power has been built upon a world commerce, and which even during the stress of war are able to maintain the most profitable world trade in their history, will not find it necessary or desirable to face the world after the war upon any other than a sound financial basis.

"With such a background as this is it probable that the new Europe will allow us to adjust the world finance of the future to suit our purely domestic whims and without proper reference to the rest of the world?

"We speak of controlling the finances and commerce of the world. What manner of assurances have we on this point? Our $2,750,000,000 of gold reserve insures for us no such position, unless each dollar of it makes to the world its own particular commercial argument in the form of an offer of credit upon which a mutually profitable business may be based.

"Europe and the world buy from us now because they must, and pay us in gold because they must. After the war they will continue to buy from us in such quantities and for such time as may be in harmony with their own interest and convenience. The controlling interest will be self-interest and not sentiment.

"If we are to become the great creditor nation of the world, as we occasionally assert, we must in our attitude to the rest of the world express the quality of broadness and of liberality. The European war has conferred on us no advantage which we cannot easily lose, only our best efforts will enable us to retain even our present position."

The views of Messrs. Pierson, McIntosh and others on the huge loans to European belligerents were shared by Festus J. Wade, president of the Mercantile Trust Co., St. Louis, Mo., who in drawing comparisons between the present war and our civil war lasting 4 years, showed that in the civil war the cost to us was 18 per cent of our entire wealth, whereas in Europe today the war has not cost some of the belligerents in foreign loans three-quarters of 1 per cent of their present wealth.

"To develop foreign trade we must develop credit and we must not fear that the nations may not meet their obligations. It cannot be possible that they will fail to meet these loans.

"Nationally we appear to lack ordinary comprehension. We slumber along peacefully, secure in the business of the past and in the comforts of the present, while our competitors are up and doing.

"Why even during the period of war, Europe with its war losses and disturbances, has already outdistanced us in progress towards preparation for the financial and commercial struggle to follow.

"England, in spite of her traditional conservatism, is preparing to build in the foreign financial field on a scale the magnitude of which almost takes one's breath away, and in doing this is only following a theory which, for years, has been of common acceptance in foreign countries.

Germany Fostering Financial Power

"Germany, in spite of inforced isolation from commercial world activities, is fostering in the foreign field every existing element of the financial power she once possessed.

"Italy, France and Switzerland are sparing no effort to extend and more fully develop their already extensive foreign financial establishments.

"Even Japan has broken away from her ancient traditions and now appears in the financial centers of the world as a power to be reckoned with.

"At the same time we, in the United States, instead of reading these signs of danger, appear quite well satisfied with a fairly comfortable present foreign success which furnishes no reasonable assurance for the future."

Mr. Pierson ended with a scathing criticism of our people in which he bluntly accused us of not being able to get together, in spite of our generally proud thought of being called the United States of North America. Here is how he put it:

"Our weaknesses clearly belong to a nation whose people and institutions have not yet acquired the art of getting together; unorganization, the lack of co-ordination of effort, a powerful machine fully efficient in domestic things but not yet properly adjusted to the more highly complicated requirements of a world situation."

In addition to the prevailing consensus of opinion that Europe will not be crippled in a manufacturing sense after the war and that she will be very aggressive in her foreign trade, Mr. Pierson contends that financially Europe will not be weak, in spite of the enormous war costs, and in spite of the enormous sums that will be expended in reconstruction work.

WASHINGTON CITIES MUST PAY TAX

Tacoma, Wash., Jan. 26—Under a ruling of the supreme court, which reversed the action of the Pierce County courts, the city of Tacoma and other Washington

cities will be compelled to pay the annual license on all of its motor cars. The municipality has about ten machines. The ruling also hits the county. Police and fire department cars alone are held exempt. The superior court held that a motor vehicle license constitutes a property tax and, under the law, the court held all municipalities are exempt from general property taxation.

The supreme court holds that "this is an untenable theory" and rules the payment of a motor vehicle license is not the levying of a property tax, but is merely a license or privilege tax, which cities must pay as well as private individuals.

PLANS RECIPROCAL LAWS

Boston, Mass., Jan. 26—Plans are now being considered for a reciprocal system to inaugurate uniform laws throughout New England, and later spread the gospel to other sections of the country. The Bay State A. A. took the matter up at its annual meeting.

It was pointed out that as the federal government has now decided that the various states may pass whatever laws they see fit to govern motorists it is evident that a good plan would be to start some sort of a reciprocal movement in New England. This is a small area and a tourist can visit all six states in a day, yet for Massachusetts motorists New Hampshire and Rhode Island have barriers, allowing only ten days sojourn in any one year. Then, too, there are barriers against motorists in those states. The situation is believed neither just or fair.

HAYDEN OUT OF PULLMAN

Chicago, Jan. 30—H. W. Hayden, vice-president and general manager of the Pullman Motor Car Co., York, Pa., is no longer connected with this organization. A. R. Cosgrove, sales manager, has charge of the purchasing department, formerly handled by Mr. Hayden. Mr. Hayden's future plans have not yet been made public, and he still retains his stock in the Pullman company.

TRUCK OWNERS TALK FENDERS

Chicago, Jan. 30—Probably the most vigorous protest against Chicago's truck fender ordinance will be lodged Thursday with the chief of police, in answer to his call for a meeting of the truck owners of Chicago to determine how long it will be before they can equip their trucks with the fenders, demanded by the present ordinance. It is expected that 300 representatives of the commercial vehicle users in the city will be present, to show the impracticability of the fenders called for.

MAY EXTEND BANKHEAD ROAD

Atlanta, Ga., Jan. 26—Extension of the Bankhead highway until it becomes a transcontinental highway stretching across the continent from Washington to Los Angeles and through the southern and southeastern states, is the latest development in connection with the perfection of this great roadway.

The road was at first intended to reach from Memphis to Atlanta by way of Birmingham and for some weeks representative organizations of these states have been hard at work perfecting their plans for the road, but, according to Secretary Fred Houser and President Frederick J. Paxon, of the Atlanta Convention bureau, the actual organization for the transcontinental extension will begin in Atlanta within the next sixty days.

Mr. Paxon is in receipt of a letter from officials of the highway declaring that since its organization hundreds of requests have come from western states begging that the organization extend the work from Washington to Los Angeles in addition to the original route.

JOLIET WHEEL TAX APPROVED

Joliet, Ill., Jan. 27.—The new and revised ordinance providing for a wheel tax has met with the approval of most of the objectors to the first measure adopted and which was finally withdrawn by the council. The fees as reduced, meet with the approval of those residing in Joliet, the only complaint recorded being one applying to the failure to assess those who use the streets for commercial purposes, yet who have locations outside of the corporate limits. Mayor Barber believes that outsiders can be reached by means of an occupational tax, through a wide tire ordinance and other measures. He is convinced that if the outsiders who use the Joliet streets for gainful purposes were compelled to pay a special tax, either under the guise of an occupational tax or some other form, the opposition inside the city would disappear.

WHITE HEADS U. S. L. SALES

Chicago, Jan. 30—John A. White, who has been connected with the U. S. L. Lighting and Heating Co. for the last eight years, has been promoted from manager of the Chicago office to sales manager and will assume his new duties at once. He will be located at the home office at Niagara Falls, N. Y. His successor as manager of the Chicago office has not yet been announced.

Volatility vs. Gravity

(Concluded from page 21)

schemes for consideration, and these were:

A—That no action of any kind should be taken by the Federal government.

B—That one or more standard specifications for gasolines be adopted and it be required that all motor fuels sold in interstate commerce under the name of gasoline shall be sold under the designation of one of these established specifications.

C—That no standard specifications be adopted, but that all gasolines or motor fuels should be labeled in some way which would indicate the nature of their distillation curve. As, for example: A fuel labeled 100-200 might mean that at least 20 per cent would distill over below 100 deg. C. and at least 90 per cent below 200 deg. C.

Conclusions

The conclusions of the meeting, although no motions were taken since the gathering was a hearing and not a conference, were briefly as follows:

1—Do not recommend any legislation for at least one year, and devote that year to finding out what gasoline ought to be to satisfy the public and the engineer.

2—Examine every possibility of preventing dishonest adulteration and the charging of high retail price for a blend having a low wholesale price.

3—That it would be a good thing to establish a permanent committee with representatives of the bureaus concerned, the refiners and the motor car industry.

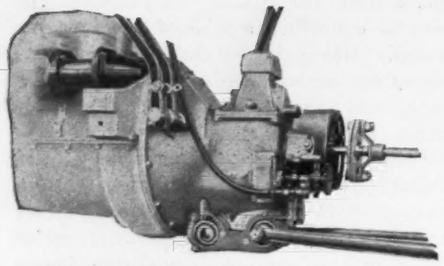
Although no official announcement has been made there seems little doubt in the minds of the representatives of the bureaus that some such committee will be formed and that the bureaus in conjunction with the motor car industry and the oil men will make a big effort to discover what characteristics motor fuel should possess for the engine of to-day.

The meeting, as already stated, was very well attended and it would take a column or more to give the names of all the important people present. To give just a few as showing the character of the meeting, there may be mentioned Dr. W. M. Burton of the Standard Oil Co. of Indiana; C. D. Chamberlain, secretary National Petroleum Assn.; Dr. F. C. Robinson, chief chemist Atlantic Refining Co.; R. L. Welch, secretary Western Oil Jobbers' Assn.; Guy Stevens, chief attorney the Texas Co.; J. C. McCabe, head of the department of safety engineering of the City of Detroit; Otto H. Klein, Board of Estimate and Apportionment, New York. The Society of Automotive Engineers was represented by A. Ludlow Clayden, ex-chairman of the Standards Committee and H. L. Horning, member of council. Representatives of many other individual oil companies and of several states and cities were also there, and it was very noticeable that the oil companies usually had two or more men representing the legal side and the technical side.

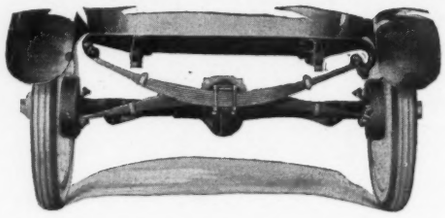
The meeting was wonderfully handled by Dr. C. W. Waidner of the Bureau of Standards. In passing a most hearty vote of thanks to the bureau, it was remarked that Dr. Waidner and his associates had throughout the 12 hrs. exhibited no prejudice, but had taken up the points, asked questions and argued details for the sole purpose of extracting the maximum of information.

Six New Cars at Chicago

Four on Display at Coliseum and Two at Congress Salon



Springs under Hassler gearbox which take driving shocks from radius rods



Cross spring suspension of Hassler with upper half at rear of lower half to lower center of gravity

CHICAGO, Jan. 29—It is to be expected each year that the Chicago exhibition will disclose a number of new cars that have not made their appearance at the show which precedes it annually at New York. This year there are four cars making their debut at the Coliseum. Only one of these presents anything radical. This is the new Hassler made by the Hassler Motor Co. Indianapolis, Ind., which incorporates some novel ideas in spring suspension and drive. The rest are all assembled from standard units and are conventional designs. These are the Stephens, made by the Stephens motor branch of the Moline Plow Co., a concern of long standing in plow and wagon building; the Chicago six, made by the Pan-American Motors Corp., of Chicago, and the Classic, made by the Classic Motor Car Corp., Chicago.

Not at New York

In addition to these new cars there are a number exhibited at Chicago which did not appear at New York. Among these are the Glide, Maibohm, Monitor, Woods dual power and Dixie. Also there were a number of cars exhibited at New York which do not appear in Chicago, but all of the larger manufacturers are present.

With few exceptions, the exhibits which were at New York were moved bodily to the Chicago show and consequently there is not a great deal in body designs which is new. Two of the electric car concerns are showing new bodies, one of them being the Anderson electric and the other the Ohio electric. The latter is a modification of the previous design without any mechanical changes. Scripps-Booth has a new town car which is making its first appearance at the Coliseum.

Interesting among the new exhibits is the Stephens six, known as the model 75. The attention it receives is due to the fact that it is made by the new motor car department of an old implement concern.

Stephens Six

For the current season, the Stephens six maker is offering two bodies, a five-passenger touring car and a three-passenger roadster, each mounted on a chassis with a 115-in. wheelbase. The standard finish for both models is royal blue with gold striping and old ivory wheels, but on thirty days' notice, three color options may be had—Brewster green, maroon and black.

Bearing the Continental stamping, the six-cylinder, block-cast motor of the Stephens six has a bore and stroke of 3¼ by 4½ in., giving it a piston displacement of 224 cu. in., and develops 40 hp. at 2500 r.p.m. Low gasoline consumption and unusual accelerating power are claimed by the maker, 16 miles to the gallon being a conservative fuel average and the car throttling down to 3 m.p.h. in high.

Lubrication of the motor is by force feed. The Stromberg carbureter and Stewart vacuum tank are essential features of the powerplant. The ignition is Connecticut, a Willard 80-amp. hr. battery being the current source, and electric starting and lighting is supplied by the Auto-Lite system.

The chassis of the Stephens six is a clean cut job, all units being easily accessible. The rear axle is of the full-floating type with spiral-bevel gear drive. The rear wheels are mounted on roller bearings that take the side thrust as well as the radial load.

Springs of the Stephens are self-lubricating, semi-elliptic, front and rear. Hotchkiss drive is used, the rear axle being bolted solid to the rear spring through which is taken the drive from the rear axle. The front springs measure 37½ in. and the rear springs 53½ in., giving a total spring length of 91 in. for a car of 115-in. wheelbase and making for easy-riding comfort.

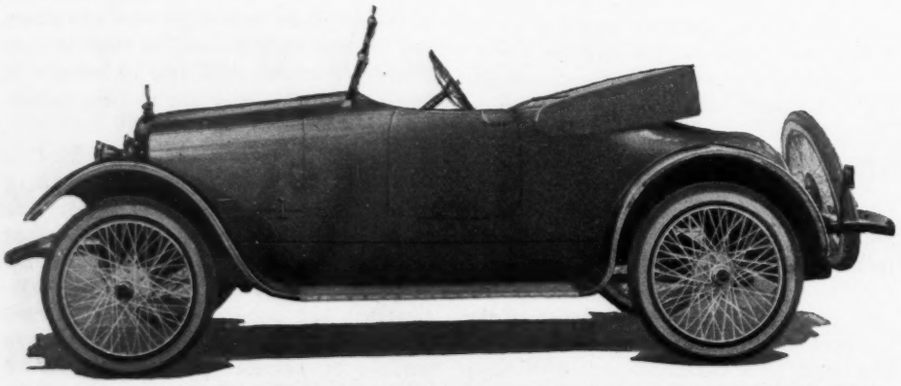
A streamline body, built in the Stephens plant by experienced carriage makers and strongly reinforced at points of heaviest strain, is a feature of appeal in both touring car and roadster. The body has good proportions and is roomy. The seats are wide and deep, upholstered in grain leather. The car rides close to the highway having a low center of gravity and a 10-in. road clearence.

The convenience feature was not overlooked in the design of the Stephens six. The clutch and brake pedals, for example, are adjustable and a Stewart engine-driven tire pump is a part of the standard equipment which includes a one-man top of silk-finished mohair, Collins patented side curtains, rain-vision ventilated windshield, electric horn, Stewart speedometer, and spare demountable rim. The tires are 32 by 4, non-skid in rear.

Hassler Unusual

Unusual features among the new cars, chiefly are exemplified in the Hassler, a product of the Hassler Motor Co., Indianapolis, a new manufacturer backed to a large extent by the same interests which have been manufacturing the Hassler shock absorber for Ford cars. The car is the development of Charles Merz, the Indianapolis racing driver who has been acting as its experimental engineer.

Although it is an assembled car, it incorporates a number of unique features which differentiate it from other cars using similar stock parts. The point of note is in the floating drive. This is made up by two double Thermoid-Hardy disk couplings which are placed at each end of the propellor shaft. Also, in the drive assembly, there are two radius bars which extend from the rear end of the gearbox to points



New Hassler in roadster form showing bumpers front and rear as stock equipment

at the extremities of the rear axle housing.

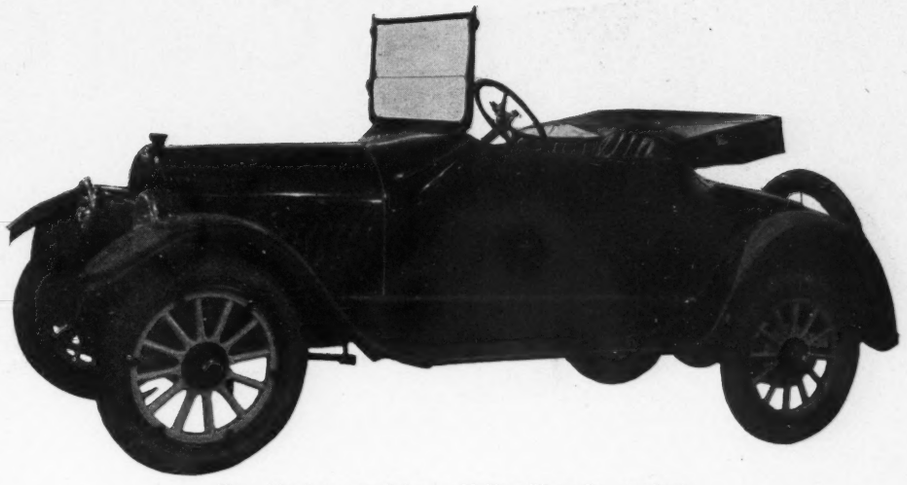
In some respects this resembles the Hotchkiss drive with the addition of the radius members which are designed to take the horizontal road shocks instead of allowing them to be transmitted through the spring eyes and shackles. Heavy volute springs are housed in casings on the under side of the gearbox. Through the inner coils of these springs the radius rod ends are bolted allowing for a free movement of the rear axle within the limits of the action of these springs. The feature claimed for the drive is that there are no sliding or working parts requiring lubrication and nothing to rattle.

Standard units in the car include a Buda four-cylinder L-head block standard motor of 3¾ by 5⅛-in. bore and stroke. This engine is claimed to develop 40 hp. at 1950 r.p.m. It is the standard Buda product with full aluminum crankcase and helical gears camshaft drive. The carbureter is a Rayfield 1¼-in., ignition by the Connecticut system with magneto type of distributer, starting and lighting by Auto-Lite in connection with a Willard six-volt 100-amp. hr. storage battery. The clutch is a Borg & Beck dry-plate design transmitting the drive to a Grant-Lees gearbox mounted in a semi-steel case and equipped with S.K.F. self-aligning double row ball bearings on both the main and lay shafts. The shafts and gears are both of nickle steel.

The drive, as explained, is through the flexible coupling and then to a floating axle which is mounted on Hyatt roller and New Departure bearings. The driving members are chrome vanadium steel and the gears a product of the Brown-Lipe-Chapin organization. The latter are of nickle steel and provide a direct drive ratio in the rear axle of 3.7 to 1. The springs are transverse X type in the rear.

Gasoline feed is by the Stewart-Warner vacuum system and Houk wire wheels provided with Silvertown cord 33 by 4-in. straight-side tires are standard equipment. The chassis wheelbase is 112 in. and the road clearance is 10 in.

A roadster body only is mounted on this chassis at present. It is a roomy style of two-passenger with a seat width of 45 in. and a passenger seat mounted slightly behind that of the driver. The body measures 66 in. from the back of the seat to the dash, 32 in. from the front of the seat to the dash and the doors are 24 in. in width. The car is completely equipped with bumpers as standard and a Boyce Moto-Meter and five wire wheels with cord tires included in the purchase price, which is $1,650.



New Stephens roadster, a Moline Plow Co. product

Chicago Has Unusual Frame

A frame of original design features the Chicago six, made by the Pan-American Motors Corp., of Chicago. It is fitted with standard parts throughout. The powerplant is the 40-hp. 3⅛ by 5 six-cylinder Rutenber fitted with a Rayfield carbureter. The gearbox and clutch are a unit with the crankcase making it a unit powerplant, the clutch being a multiple-disk dry-plate type transmitting the drive to a Warner selective three-speed gearbox.

The drive is flexible with both propulsion and torsion taken through the rear springs. The latter are mounted directly beneath the main frame member so that in transmitting the drive there is no twisting stress on the frame. The latter has a double pick-up in the rear giving the car an extremely low center of gravity and bringing the body quite close to the ground.

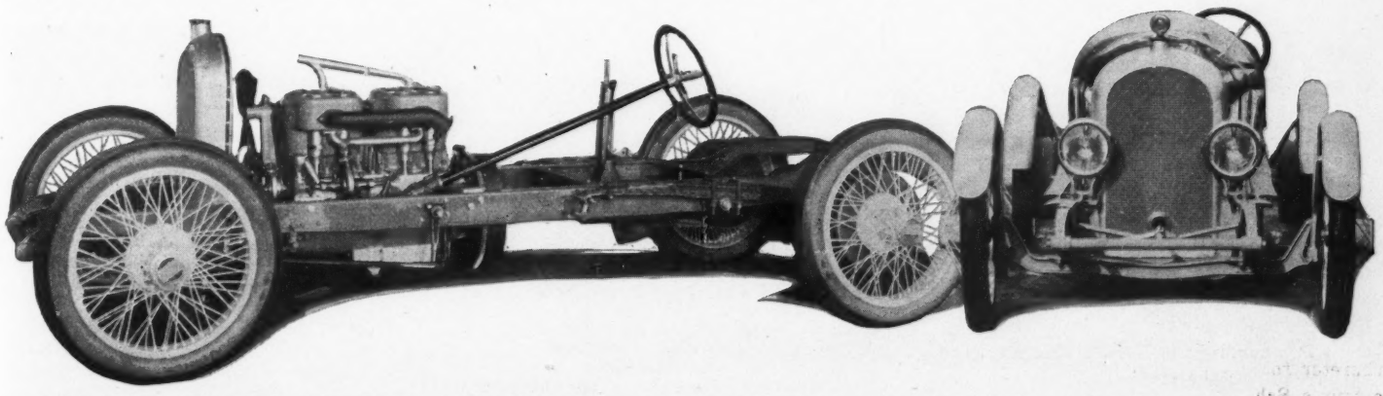
Chassis construction is simple with the frame wide at the rear, tapering at the center and parallel and narrow at the front. This permits the two supporting points at the rear of the powerplant to be mounted directly on the main frame while providing a wide body mounting at the rear. The rear springs are 57 in. long, semi-elliptic, 2 in. wide.

They are underslung under the rear axle which also has a tendency toward lowering the center of gravity of the car. The axles are Timken and provided with Timken roller bearings throughout. The brake drums are 12 in. in diameter with the brakes internal and external operating upon them. The wheelbase is 120 in. and the tire size 32 by 4. Gray & Davis electrical equipment is used for starting, lighting and ignition. The storage battery is a Willard and throughout full equipment is used.

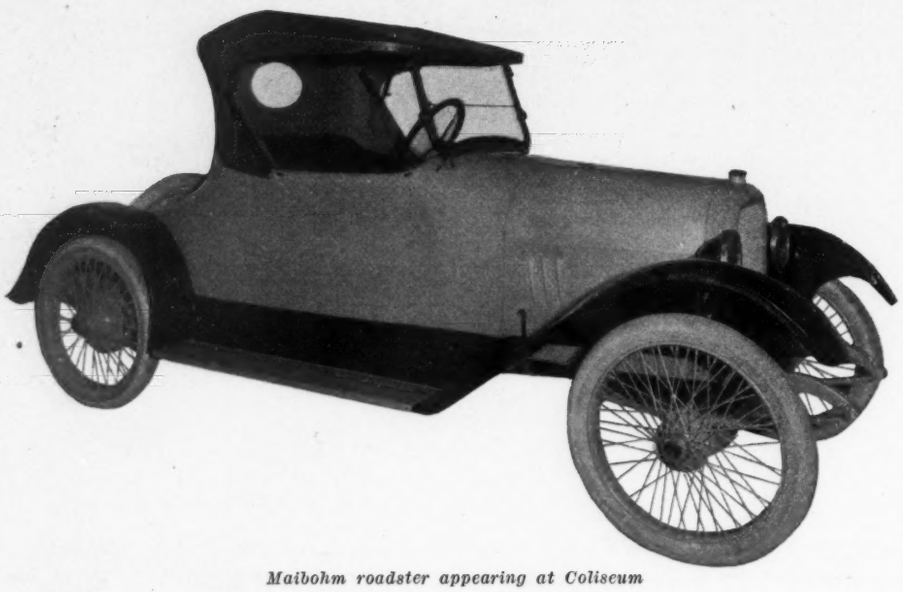
The body is of a moulded form with lake blue as standard color. The running gear, wheels and windshield frame are finished in pure white enamel. The price is $1,250, with $75 extra for a set of Houk wire wheels.

New Scripps-Booth Town Car

Scripps-Booth is showing a new town car style of body. This is on the brougham style with the top extended only over the passenger compartment and open over the front or driver's compartment. It is fitted with a sloping windshield and the body line from the dash to the rear of the front compartment is dropped slightly below the line of the passenger entrance door. The trimming and upholstery is in leather in the front compartment and in cord for the



The Disbrow, a speedster designed by the racing driver, Louis Disbrow, and which is shown at the Salon and described on other pages



Maibohm roadster appearing at Coliseum

passengers. The body also is relieved by a white trimming line at the point of juncture between the hood and the cowl. There is also a white stripe running over the top of the cowl and along the side line extending clear around the body.

Classic

The Classic, produced by the Classic Motor Car Corp., Chicago, is a straight assembled job employing a standard Lycoming 3½ by 5 four-cylinder engine, Borg & Beck clutch, Mechanics Machine gearbox, Gemco floating axle, Gemco steering, Youngstown radiator, and other well-known standard parts. It has a wheelbase of 114 in. and a tire size of 33 by 4. It is sold completely equipped, being provided with a spotlight and bumper, at $885.

Glide Boosts Price

The Glide, made by the Bartholomew Co., Peoria, Ill., is on hand at Chicago. Mechanically the car has been illustrated and described in these pages. The price, however, has been raised from $1,125 to $1,250. This car is assembled from well-known units such as the Rutenber 3⅛ by 5 six, Brown-Lipe gearbox and differentials, Westinghouse electrical equipment, Stewart-Warner vacuum system, etc. The body is roomy having a 47-in. rear seat and a 42-in. front. It is finished in meteor blue with black running gear. Wheelbase is 119 in. and the car is provided with 34 by 4-in. tires. A detachable sedan top is provided for $200.

Monitor Shows Two Chassis

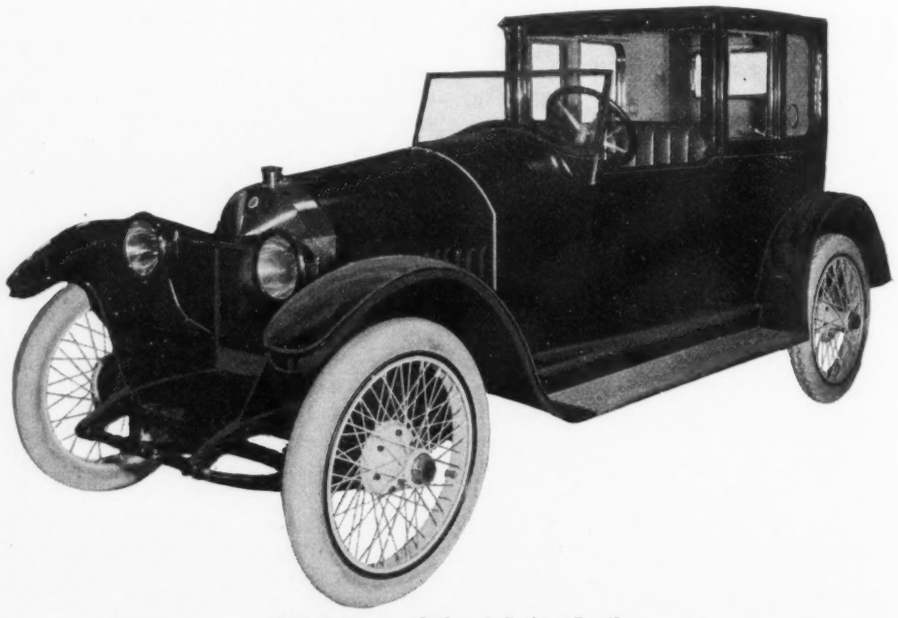
Two chassis are exhibited by the Monitor company which is one of the concerns which did not have space at the New York show. These are a four and a six, and many of the parts of the two are interchangeable. The motors are: a six-cylinder Continental 7 W. 3¼ by 4½ for the six, and a four-cylinder Golden-Belknap & Swartz for the four. The electrical equipment is made by the Heinze company, the carbureter for the six is a Stromberg and the four a Schebler, and the chassis parts are made by equally well-known parts makers. The wheelbases are 110 and 117 in. respectively for the four and six.

Outside Exhibit

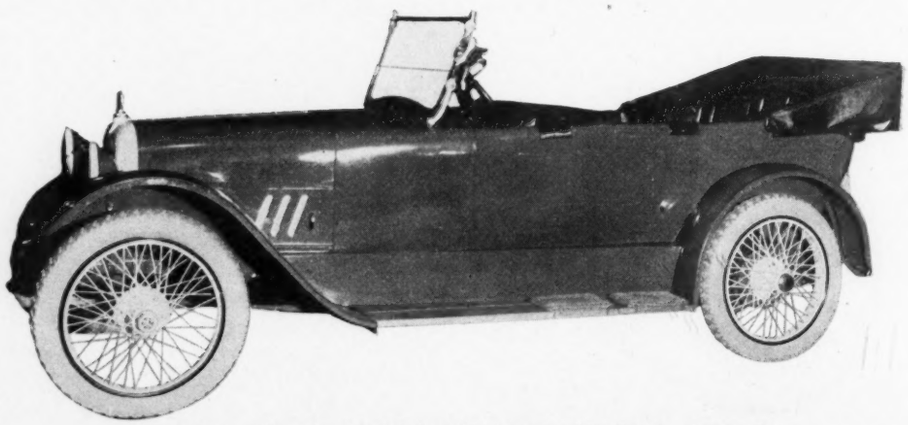
Across the street from the Coliseum the Comet Automobile Co., has its touring car on exhibition. This concern has its home in Decatur, Ill., and is showing a car with a six-cylinder 3⅜ by 5 block motor equipped with Delco ignition, Dyneto starting and lighting and a Zenith carbureter. Clutch is a Borg & Beck and the axle is floating. The springs are cantilever, 50 in. in length. This car sells for $1,185 and is equipped with a double cowl body.

Outside Exhibits

At the New Southern hotel is the Colonial, made by the Colonial Automobile Co., of Indianapolis. This is an assembled six with an overhead valve engine, operated by exterior pushrods and rocker arms. Over the head of the engine there is a detachable cover plate and the priming cups are in the side of the cylinders. The wheelbase is 116 in. and the chassis construction is simple with a drop frame used in connection with cantilever spring mounting. The clutch is an inverted cone and the gearbox has three speeds; gears carried on New Departure bearings. The axles are the product of the Lewis Spring & Axle Co., with the drive pinion on New Departure bearings and the differentials carried on Gurney bearings. The car is listed at $995.



New town car body of Scripps-Booth



Chicago Six with white enameled radiator and white hood louvres

Net Profits, $9,550,000

Goodrich Company's Financial Statement Shows Sales Were Smaller Last Year

Decrease Due to Selling Prices Not Keeping Pace with Costs

AKRON, Ohio, Jan. 27—Net profits of $9,550,000 were made last year by the B. F. Goodrich Co., according to the annual preliminary statement made by President B. G. Work at the close of the meeting of the board of directors. No statement of gross sales was made. The net sales were $3,000,000 less than last year, due, it is stated, to the fact that "selling prices did not advance as rapidly as increased cost of production."

Nine thousand shares of preferred were ordered retired, making a total of 36,000 shares retired since the present corporation was formed. The original preferred capitalization was $30,000,000.

No change was made in the dividend rate on common. Two preferred quarterly dividends of 1¾ and one of 1 per cent on common were declared.

To the company's surplus of $10,580,000 on Jan. 1, 1916, has been added revenues, making undivided profits of more than $14,000,000, subject to dividend retirement of preferred and $100,000 pension fund.

OUTLINE INTER-CITY RELIABILITY

Chicago, Jan. 29—Reliability contests, in which teams from the major cities will compete, probably will be instituted this summer as the result of a meeting held today at the Chicago Automobile club, which was attended by representatives from the motoring organizations of New York, Chicago, Indianapolis and Detroit, as well as by Chairman Kennerdall of the contest board of the American Automobile Association, and Alfred Reeves, general manager of the National Automobile Chamber of Commerce.

These contests will be along very much the same lines as the Inter-Club contest originated by the Chicago Automobile club, and which are semi-annual affairs between that organization and the Chicago Athletic association. These are amateur events, in that they are open only to club members and only those who own their cars and do not operate a car as a means of livelihood are permitted to drive. For the Inter-City contest, it is expected that each city will enter teams of from five to ten cars, penalties being assessed for lateness at controls, taking on supplies out of controls, work on the car, etc.

According to present plans the Inter-City run for this year will be a three-day affair, starting from Buffalo early in August. A definite route and conditions and date are to be settled later. A committee consisting of one representative from each city entering is to be appointed with S. E. Hibben of Chicago, as chairman. Representatives of the following cities have pledged teams and their committee representatives are: Indianapolis, H. H. Rice, Marmon company; New York, C. G. Sinsabaugh; Detroit, W. S. Gilbreath; Buffalo, Dai Lewis. In addition to these cities it is expected that Boston, St. Louis, Pittsburgh and Toledo will enter teams. Aside from those mentioned, representatives at the meeting included Ray Owen of Owen-Magnetic, W. E. Metzger and F. E. Moscovics of Nordyke & Marmon.

FLORIDA WANTS WINTER RACING

Tampa, Fla., Jan. 26.—Local car owners are agitating the development of interest sufficient to enable the construction of a speedway on which to employ drivers during the winter months. Now that there are no more Ormond meets the reversion to motor car racing as a winter amusement along the coast may be expected.

MAY REVIVE ELGIN CLASSIC

Chicago, Jan. 29.—Tentative plans for the revival of the Elgin road races this year were made to-day at a meeting of Elgin representatives with representatives of the Chicago Automobile club, the Chicago Speedways Association, and Chairman Richard Kennerdall of the contest board of the A. A. A. If the decision is made to hold the race this year it may be made a championship event.

Elgin road races until last year were the oldest classic in motor racing, having been run successively for seven years. They were abandoned last year on account of it being impossible properly to police the course, since the militia which formerly had been used for this purpose, had been sent to the Mexican border. Now that the troops are back, it is expected that there will be no difficulty on this score this season.

Runs 23,600 Miles

Non-Motor Stop Car Averages 15 M.P.G. in 1560-Hour Drive in East

Began November 22 and Traveled Through New England Cities

BOSTON, Mass., Jan. 26—After being on the road day and night since Nov. 22 the Maxwell non-motor-stop car was checked in at the city hall here at noon today and Mayor James M. Curley pulled out the plug that brought the engine to a stop. It had been running 1560 hrs. and had covered 23,600 miles in that time. The car went along through all kinds of weather, and visited many of the cities where there were motor shows, and it attracted a great deal of attention. It had been on the road just 65 days. Manager McConaha of the Maxwell branch figured out that there was no use in keeping it going although the drivers wanted to run it until show time. As no sanction had been asked from the A. A. A. and a corps of expert observers were not employed the company is not making a claim for any official record for the car. It used Converse tires, and they averaged 10,500 miles, one shoe still on the car having passed 13,000 miles. The gasoline average was 19½ m.p.g. and the oil was 450 m.p.g. The speed averaged just under 15 m.p.h.

MULFORD TO BE WITH HUDSON

Detroit, Jan. 27.—Despite many report to the contrary, Ralph Mulford will be the star driver for the Hudson racing team this coming season. Mulford did consider the purchase of a Peugeot car and expected to race it himself, but has reconsidered and will continue with the Hudson company engineering staff.

Non motor stop Maxwell being brought to halt in Boston after rolling up 23,600 miles

Pick-ups from the Accessory Exhibits

New Lamps, an Electric Valve Grinder and a Can Tipper for Labor Saving

CHICAGO shows are not prolific in new accessories, nevertheless there always is a number of devices—mostly of Western origin—which have not found their way East and did not appear in the New York exposition. On these pages some of these are described as well as others which were shown at New York.

Oakes Products

The Oakes crank lock for use on Ford cars combines a license holder, crank holder and car lock. The price of the complete equipment is $1. It consists of a main metal bracket readily attached to the car by the two front-spring support bolts. This bracket is forked over the starting crank and above this two arms are pivoted which may be raised out of the way or dropped over the crank lever, holding it rigidly in place. On the end of these two arms are holes through which the padlock is inserted when one desires to lock up.

Another is Oakes Beartone fan horn for Fords. The new price on this instrument is $3.50, a reduction of $1.50 from the previous selling price. The instrument consists of an assembly mounted in place of the regular fan. Within the fan blades is a horn consisting of the customary steel ratchet and a thin steel diaphragm that vibrates to produce the warning signal.

One of the features of this horn is that the volume of tone can be controlled by the operating lever. The Oakes Co., Indianapolis, Ind.

Sexton's Castor Motor Oil

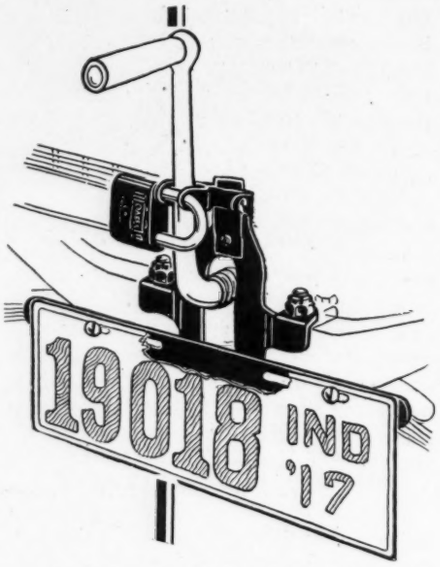
This is a patented lubricant containing pure vegetable castor oil combined with high grades of mineral and other vegetable oils. It is said to give all the advantages of pure castor oil at a fraction of its cost. By regulation of the amount of castor used there are grades of Sexton oil for every type of motor, and the company offers a booklet recommending grades of oil for every make of car. Sexton Oil Co., Chicago.

Dixon's Graphite

This lubricant is composed for use in the engine, gearset, differential, timing gears, universals, pump cups, overhead-valve cups, thrust collars, wheels, spindles, chains, springs, etc. It is made up in a variety of grades to meet the uses described above, and the consistencies include a pure flake compound or mixtures of graphite and high grade non-flowing oils. Joseph Dixon Crucible Co., Jersey City, N. J.

Jackson Electric Valve Grinder

This is a compact portable, motor-driven tool said to be capable of grinding valves perfectly in a fraction of the time usually required. In operation the oscillating motion employed in hand grinding is followed at 400 to 750 oscillations per minute imparted to the valve. A flexible, cushioned contact is provided between the valve and the grinder mechanism which admits of a light, medium or heavy pressure upon the valve for accurate work. There are two sizes, one for garages, which takes valves up to 2¼-in. diameter, and one for continuous heavy duty manufacturing purposes capable of grinding valves up to 4-in. diameter. The grinders are shipped complete with flexible cable, connector, plug, hand controlled switch, and slotted and spanner valve bits. The Kalamazoo Railway Supply Co., Kalamazoo, Mich. The Chicago exhibit is conducted by Wales-Adamson Co., 1402 S. Michigan Avenue.



The Oakes cranklock, a combination of car lock, crank support and license bracket

Two New Solar Products

Solar has a new windshield spotlight with an adjustable miror, a switch on the lamp, an outside focusing device, and a universal frictional adjustment. The bracket permits turning of the lamp in any direction without need of thumb-screw adjustment. The screw focusing device is operated by a knurled nut from the outside of the lamp. The price in black and nickel with mirror is $7.50, and without mirror is $6.75. Finished all nickel the prices are $10 and $9.25. The other new offering is the Duplex headlight. This is really two lamps in one. The steel shell is built with a large oval for the large lamp and a small oval for the city driving lamp, the assembly combining the two lamps into one unit. The large reflector opening is 9½ in., and is fitted with an 18 c.p. bulb, while the small reflector opening is 3½ in., and is fitted with a star lens, and a 12 c.p. bulb. The price is $20. C. M. Hall Lamp Co., successors to the Badger Brass Mfg. Co., Kenosha, Wis.

Curtis Tire Filling Station

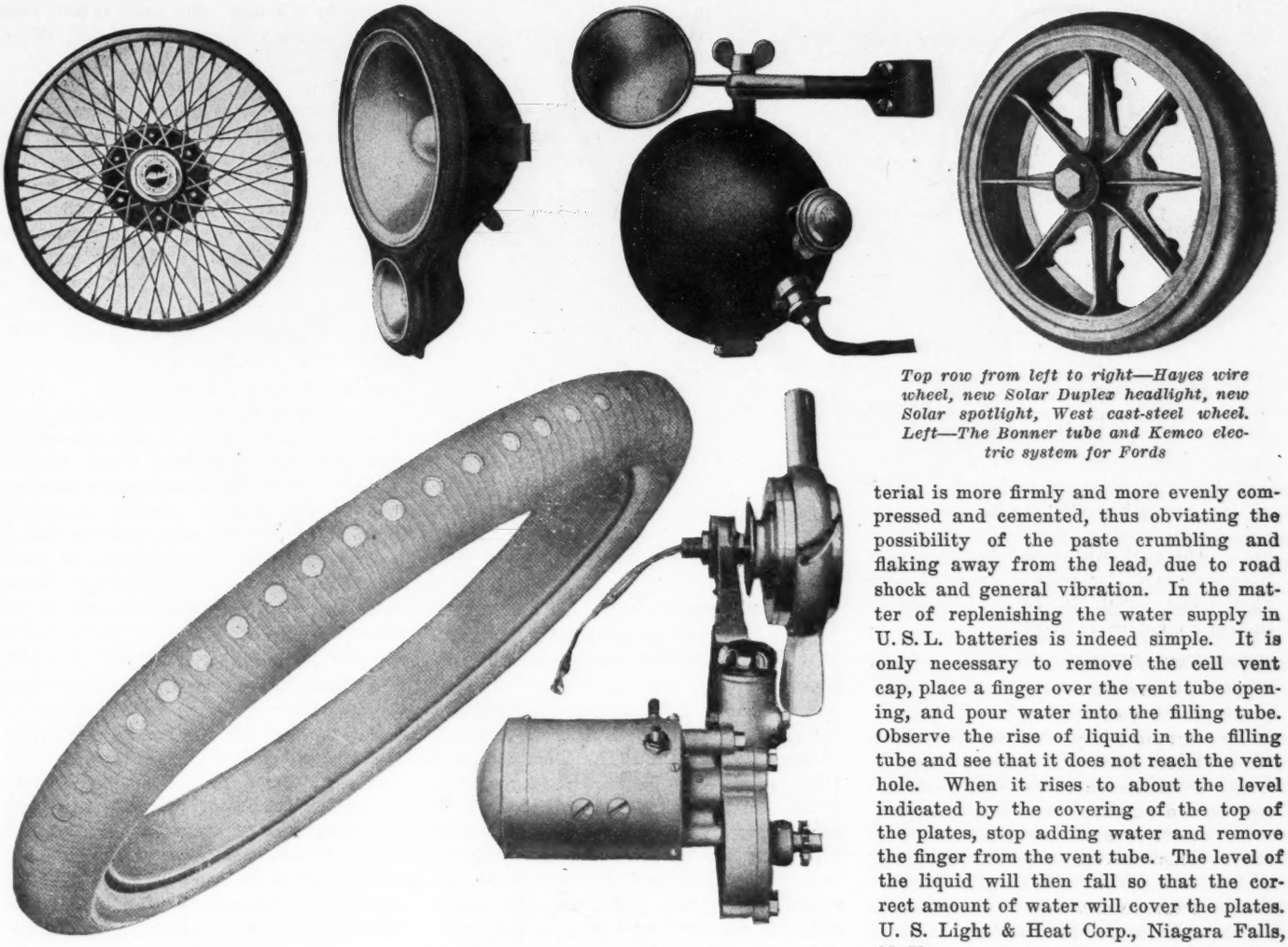
With the Curtis correct pressure tire filling station, you turn the dial to the size of the tire you intend to fill, and you get the correct pressure in the tire regardless of the pressure carried in the storage tank. The filling station is a neat pillar device for installation on the curb or other convenient place, and this is dependent on a pump and pressure tank located under cover. The station is enameled in an attractive Parisian yellow color, making it a great attention getter. The base is a locker compartment in which the hose is stored under lock and key. The price includes free-air sign, a 25 watt tungsten lamp within a canteen shaped transparent free-air light sign on top, a 33-watt carbon lamp inside of the gauge case for illumination of the dial and gauges, 30 ft. of oil-proof air hose and an automatic tire chuck. Price is $135. Curtis Pneumatic Machinery Co., St. Louis, Mo.

Gargoyle Mobiloils

There are six grades of Gargoyle Motor oils. The grade A is one of medium body, the grade B of heavy body, the grade BB of medium heavy body, the grade E of light body, and the Arctic. The manufacturers have prepared a table in which is included practically every automobile manufactured, recommending one of these grades for use in the various models from 1913 to 1917. There is a grade D for Stanley cars and steam tractors, a grade C for gearset and differential lubrication, and a grade CC for gear lubricant. The line also includes hard greases, and four grades of Zeta engine oils produced to meet the demand for intermediate priced lubricants. Vacuum Oil Co., Rochester, N. Y.

Burg Cotterpin Puller

The handle on this cotterpin puller slides along the shank in a manner that permits of the pin to be removed by impact after hooking into the eye of the cotterpin. The tool consists of a short steel rod about ¼-in. in diameter, having a small hook at one end and a sliding handle headed at the opposite end. It is said that this puller will remove practically any sized pin in use in the car, and is also useful in spreading cotterpins when replacing them. It is made in two styles, black finish $1, nickel



Top row from left to right—Hayes wire wheel, new Solar Duplex headlight, new Solar spotlight, West cast-steel wheel. Left—The Bonner tube and Kemco electric system for Fords

plated $1.25. Wales Adamson Co., 1402 S. Michigan Avenue, Chicago.

Gould Storage Battery

The feature of Gould batteries is the method of assembly. In the demountable types the cells are assembled in the case as individual units. They are separated from each other by wooden spacers. At one end of the battery between the cell and the case is a board to which are attached heavy springs. This board is forced into place and holds the cells firmly in position by spring pressure, thus obviating the use of bolts or other devices which may become damaged by corrosion from electrolyte. To dis-assemble the battery one unbolts the connectors, and removes the board to which the springs are attached. Any cell can then be removed without interfering with other cells. Gould Storage Battery Co., New York.

Detroit Storage Batteries

An innovation in battery construction has been accomplished in the new universal clamp terminal used on Detroit batteries. First of all it is easily applied or removed regardless of the age of the battery. As all parts are heavily plated with lead, corrosion is reduced to a minimum and will never cause the terminal to freeze on. Should the parts finally become worn they can be easily replaced. Its conductivity is due to its large contact surfaces. As the lug can be applied to the terminal posts in a number of positions, this allows the cable to leave the battery in any desired direction. Detroit Battery Co., Detroit, Mich.

Non-Gran Bearing Metals

Non-Gran bars of bearing bronze contain no flaws or defects or crooked or off center cores. There are six different sizes in the 6-54 assortment for repairmen, including a ⅞-in. solid bar, and cored bars from 1 by ½ in. to 1⅝ by 1 in. This gives a range of material in which practically any bronze bearing used in a motor car can be turned. American Bronze Co., Berwyn, Pa.

Neverleek Top Materials

Neverleek is a material especially designed to meet the severe conditions to which a motor car top is subjected. New, live rubber makes this top covering waterproof. It is claimed that it will not shrink, stretch, blister or fade, and will wear as long as the car itself unless actually abused. It is made in a variety of weights and grains. F. S. Carr Co., Boston, Mass.

U. S. L. Storage Batteries

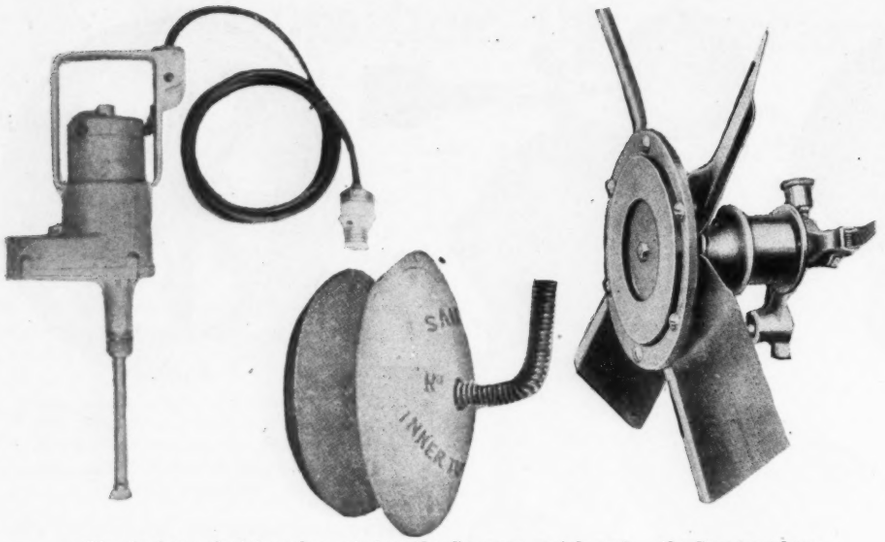
U. S. L. storage batteries are assembled with machine pasted plates. The advantage of machine pasting over hand pasting, according to this maker, is that the material is more firmly and more evenly compressed and cemented, thus obviating the possibility of the paste crumbling and flaking away from the lead, due to road shock and general vibration. In the matter of replenishing the water supply in U. S. L. batteries is indeed simple. It is only necessary to remove the cell vent cap, place a finger over the vent tube opening, and pour water into the filling tube. Observe the rise of liquid in the filling tube and see that it does not reach the vent hole. When it rises to about the level indicated by the covering of the top of the plates, stop adding water and remove the finger from the vent tube. The level of the liquid will then fall so that the correct amount of water will cover the plates. U. S. Light & Heat Corp., Niagara Falls, N. Y.

Detroit Test Plug

With the test plug one can see how a very slight variation in the mixture will cause the explosion flame to vary in color from the smoky yellow of too much gasoline to the clear blue of perfect combustion. It will pick out a weak cylinder, showing lost compression. It will show whether a cylinder is pumping oil badly, because small spatters will gather on the glass. It will show whether a plug fires properly under compression. It consists of a cylindrical instrument which is screwed into the spark plug hole. The spark plug is in turn screwed into the test plug. There are four windows on the side of the test plug through which may be seen the action of the sparking points. The price is $1.25. Detroit Accessories Corp., Detroit.

Bonner Tubes

Bonner tubes are made of specially selected rubber over a curved steel mandrel, a strip of non-stretchable fabric is vulcanized into the tread close to its inner surface and the tread then built up extra thick by the laminated process. After the tube has been vulcanized it is stripped from the mandrel and turned inside out. The large outside circumference thus becomes the inner circumference, and when the tube is inflated the thickened rubber tread is automatically compressed to a



The Jackson electric valve grinder, the Sampson patch and the Beartone horn

point where it will close instantly and without loss of air pressure, and all ordinary tread punctures, so it is claimed. Bonner Sales Corp., Chicago.

Hayes Wire Wheels

Although Hayes wheels have been produced only a year, the factory is already turning out 500 a day. The feature of this wheel is the ease with which it may be removed. Although there is no load carried on the hub cap, it is only necessary to remove it in order to release the lock which holds the wheel to its hub. The shell of the wheel hub contains six depressions into which lugs from the inner hub fit, thus locking the two hubs together effectively. Hayes Wheel Co., Jackson, Mich.

Easyon Chains

Easyon chains are single chains fastened to the spokes with leather covered fasteners which do not injure the paint. The gripping member is made of steel over ⅛ in. thick, rounded and perfectly smooth where it comes next to the tire, but having the thin edges projecting away from the tire so that they take a powerful hold in mud, snow or ice. Easyon chains are packed in a set of eight in a bag; four for each rear wheel. They sell for $3 to $5 per set, depending on the tire size. Woodworth Mfg. Corp., successors to Leather Tire Goods Co., Niagara Falls, N. Y.

West Cast-Steel Wheels

The West Cast-Steel wheel for 3-ton trucks weighs but 175 lb. The wheel of wooden construction weighs nearly twice this amount. This is an example of the light weight obtained by a scientific layout of the spokes and ribbing in this cast-steel wheel. The hubless type is new and is made for pressed-on and demountable types of tires.

This wheel is machined to fit in the hub and flange. There are already 35,000 of the standard hub type in use and it is claimed that there has not been a single failure. In this the hub is cast integral with the wheel. The West Steel Casting Co., Cleveland, O.

K-W Road Smoothers

Springs and air pressure are used in the K-W road smoothers to eliminate shocks when applied to Ford cars. They are supported between the axle flange and the leaf spring. The plunger housing is fastened to the axle flange, and the connecting rod from the piston is fastened to an anti-side motion link which is in turn supported to the leaf spring. The main shock is taken care of by the helical spring operating between the piston and the bottom of the cylinder, and this piston is made tight with an automatic lubricating pad, and above it is an air chamber to take care of rebound. The price per set of four K-W Road Smoothers is $15. K-W Ignition Co., Cleveland, O.

New Kemco Starter for Fords

The new model Kemco differs from preceding models chiefly in the fact that the starting motor is now located under the hood, whereas it formerly projected in front of the radiator. The starting motor is chain driven from the front of the crankshaft, and the generator takes the place of the fan, and carries four fan blades in its outside surface. The weight of this generator is 13 lbs., and it is driven direct from the crankshaft over a 5-in. pulley by a V-belt. The price is $100 complete. Kemco Electric Mfg. Co., Cleveland, O.

Motor Eye

The Motor-Eye is a thermometer operating under water within the radiator and registering in a disk placed on the top of the filler cap. It registers the motor temperature accurately at all times, thus giving the driver a check on the efficient or inefficient operation of his motor. It is made up in a variety of types for use on the different makes of cars, and in the standard type with a round dial sells for $5. Metalware Corp., Chicago.

Sampson Puncture Plugs

To insert a Sampson featheredge puncture plug, one punches a hole around the puncture with the special pliers, spreads the hole with these pliers, inserts the plug, tightens the plug by turning the screw wire, breaks off the wire, and the job is finished. The 50c outfit consists of pliers and three different sizes of plugs. Extra plugs cost $1.75 per dozen. Stevens & Co., New York.

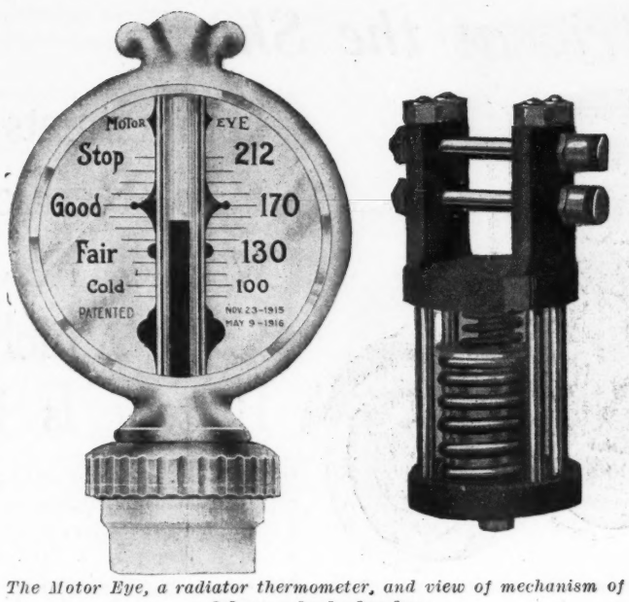
Wonder Worker Specialties

Included in the line of Wonder Worker specialties is a Never-Freeze compound for radiators which will not boil over or evaporate, it is claimed. One application is sufficient for a season, as the compound remains in the radiator, and it is only necessary to replenish with water as required. A gallon can sells for $1.25. Other products are compounds for renewing tops, brightening horns and lamps, engine enamel, body varnish, patches, tire cement, gasket cement, rim shellac, valve grinding compounds, carbon remover, soap, and a variety of other useful products. Gray-Heath Co., Chicago.

New Halladay Products

The newest thing in Halladay accessories is the can tipper. This is an all-steel standard which holds all 5-gal. cans, either square or round. The can is placed in the tipper, and when it is desired to pour from the can it may be tilted forward with practically no muscular effort. It prevents the spilling of oil and avoids the lifting of 35 lb. or so of weight. The Halladay suitcase or package carrier is a simple clamping device for attachment to the running-

the Halladay can tipper and the new The Halladay suit case and parcel carrier, universal clamp terminal found on Detroit batteries



The Motor Eye, a radiator thermometer, and view of mechanism of Johnson shock absorber

board, which in conjunction with straps will hold two suitcases or heavy packages rigidly. It is adjustable to one or more suitcases of any width. The outfit includes two clamps and slides, each provided with heavy leather straps.—L. P. Halladay Co., Streator, Ill.

A Spotlight for Fords Exclusively

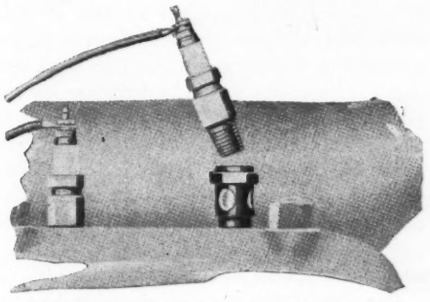
Dynolite is an electric windshield spotlight designed exclusively for the Ford car. It operates from the magneto and uses a 6-volt, 24-candlepower bulb, throwing a ray more than 1,000 ft. The handle of the lamp contains a focusing device that requires no tools to operate. The electric current is switched on and off by a switch in the handle. The bracket is a patented feature. All the joints are made in a cup suction shape with waterproof edges, and a patented door makes access to the bulb easy. Parts for the lamp can be obtained as needed. Detroit Starter Co., Detroit.

Kelly Wire Wheel

The new Kelley wheel can be removed or replaced in 6 sec., cannot stick and cannot be thrown off the hub under any circumstances. The hub cap carries no load, but is merely a dust cap. There are three parts: the wheel, the hub and the hub sleeve. Lugs on the hub and wheel are securely locked by the driving sleeve which slips in between the two. The sleeve is held in place by a spring plunger. To remove the wheel it is only necessary to remove the dust cap, pull out the driving sleeve, give the wheel a quarter of a turn and pull it off.—Cranftsman Motor Corp., Chicago.

HUDSON SALES DISTRIBUTES OIL

The G. L. W. spring oiler described in the issue of MOTOR AGE January 25 is marketed by the Hudson Sales Co., 7 E. Jackson Blvd., Chicago. This consists of a felt pad, metal covered, which lies flat on the top leaf of the spring. The felt is hollowed out in the center and carries a quantity of oil which gradually works its way down over the sides of the spring leaves and thus in between the leaves, giving a constant inner leaf lubrication. The pad is attached simply by snapping it in place. The advantages of spring lubrication in preventing spring breakage and spring squeak and also in improving the riding quality and tire life of the car are well known. This device sells for 20 cents.



Showing application of Detroit test plug which keeps check on operation of cylinders

Free-air curb filling station, a Curtis product

HUPP ENGINE FOR DEMONSTRATION

Detroit, Mich., Jan. 27.—The Hupp Motor Car Co. has given the Michigan State Auto School a specially cut-out engine and rear axle for demonstration work in the lecture room. It is hoped that this will serve as an object lesson to students of motor car construction, and will give them practical as well as theoretical knowledge of design.

MILWAUKEE FORD SPEEDING UP

Milwaukee, Wis., Jan. 29.—A. W. L. Gilpin, manager of the Milwaukee plant of the Ford Motor Co., has received instructions to increase the daily output at this point from 90 to 135 cars. This will increase the output for the fiscal year ending August 1 from 28,000 to 33,000 cars. From August 1, 1916, to January 1, 1917, the Milwaukee plant produced 11,000 cars and it now has orders in hand for an equal number. The production during the last fiscal year was 11,618 cars. The maximum capacity of the Milwaukee works is 180 cars a day.

EXTENDS TIRE PROTECTION BUSINESS

Stevens Point, Wis., Jan. 29.—Incorporation of the steel tire protector business founded at Stevens Point, Wis., several years ago by J. J. Bukolt, is now under way and within a short time articles will be filed in behalf of a company to be capitalized at $200,000. There is now available for the purposes of this business a large factory building just vacated by the Automatic Cradle Mfg. Co., of which Mr. Bukolt also is president, to take the occupancy of a new group of industrial buildings. New equipment is being purchased and will be delivered in time to begin manufacturing operations on tire protectors on a large scale by May 1. During 1916, more than 2,000 sets of protectors were manufactured, and booked orders call for nearly twice that number.

WINNIPEG-GULF ROAD SURVEYED

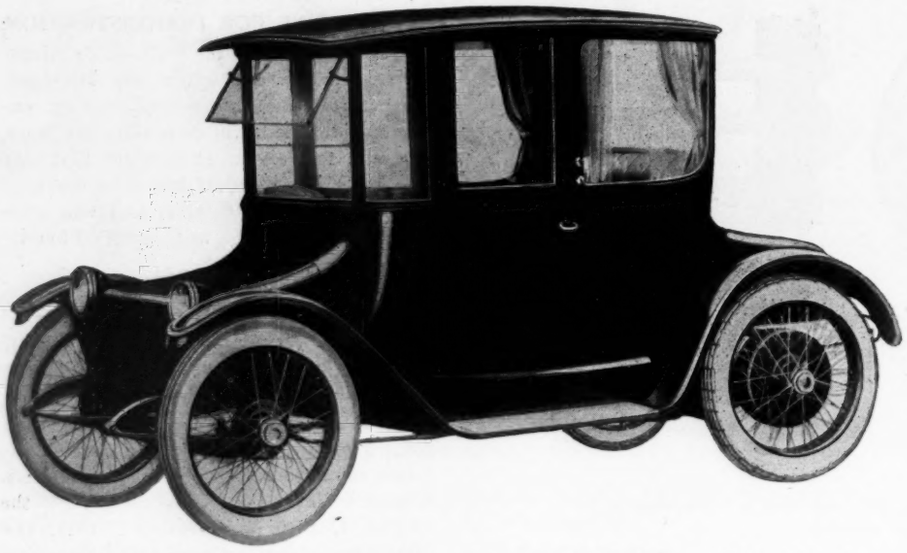
Austin, Tex., Jan. 27—The King of Trails highway, the new military road from Winnipeg, Man., to San Antonio and Galveston, has been completely surveyed by the association engineers, and Austin has been placed on the route.

United States military engineers, in company with D. F. Colp, of San Antonio, are inspecting that portion of the highway between San Antonio and Denison, Tex., and further inspection will be continued as rapidly as possible.

The official car is at present marking the highway from Waco to San Antonio and Galveston, and as weather conditions will permit the crew will continue to work north, finishing at Winnipeg in the early spring. This mark is a yellow band, 16 in. in length, with K-T stenciled on it in black.

The Electric at the Show

Refinements and Price Reductions Mark the Car Over Which the Battery Is King



Greater efficiency in production has given to the public this Detroit model 68 *at* $1,775

COLISEUM, Chicago, Jan. 27—Chicago with its level stretches and smooth boulevards invites the use of the electric more often than do its sister cities who have to put up with hills of more or less exacting grades. For this reason the electric cars on exhibit at the motor show this week are attracting a great deal of attention. Five makes are represented at the Armory. One of the five is the Woods Dual Power, but it is not other than fair to include it, since it can be driven as an electric as well as a gasoline car or both.

A Model at $1,685

That the electric is more than ever apt to be a family car is evident in the models on display. Refinements of structure and efficiency of production have made feasible a lighter car requiring less current to run it and a price within much easier reach of the average pocketbook. The effect of the price on the sale of the electric long has been evident, and the nature of the car, with its expensive mechanism, has kept the price higher than it would have been if given the same conditions under which the gasoline car is produced. Now that one exhibiting maker has found it possible to produce a model at $1,685 it stands to reason that other makers can do likewise in time, so the effect of price may cease to be a detrimental one.

Many car owners prefer the electric for certain use. Chicago has thousands such. The ease and convenience of its operation eliminates the need, or the wish, for a chauffeur. No water freezes on a cold night while the owner is in the club or in the theater. No balky engine must be coaxed or warmed up before responding. For the short trip it is considered par excellence by its adherents, who often keep the electric in the same garage with the gasoline car that they may have it for these short trips. Classed of old as a woman's car it has been adopted by many men for the run down to the club, to the office, to see a man.

One of the makers exhibiting this year has sold 3000 of his electrics to Chicago owners. Another, a later comer into the industry, has sold 1000 in Chicago. And so it goes. Sales are reported as increasing rapidly, just as the sale of the gasoline car is increasing rapidly. Statistics gathered by those most interested in the electric show that the small towns have a larger proportion of electrics than they had formerly. One make had an increase of 281 per cent, all told, in 1916 as compared to 1915. The models for 1917 in general are built on newer body lines and are even more luxurious in appointment, while price reductions are the rule also, owing to greatly increased output.

Electric Business Is On Increase

The export business of electrics has increased by leaps and bounds, it is reported, and nearly all the foreign countries are included in the purchases of American-made electric vehicles. Some of the largest exportations are those to South America, China and Norway. The electric taxicab has become by no means an unimportant factor in the manufacture. The town car on display among the electric exhibits represents a type of electric taxicab. This same town car has just been sold in a lot of twelve to a Chicago concern for livery service.

The battery exchange system, which does much to simplify operation of electrics, is popularizing the type. It was developed first in Hartford, Conn., and soon spread to other cities, including Baltimore, Boston, San Francisco and Spokane. Power in general has become cheaper, however, and increased facilities for charging the electric at service station and power houses have been a result.

The system of battery exchange is that of selling electric motor transportation by the car mile instead of selling electric current for battery charging by the kilowatt hour. A central station, say, owns batteries which it leases at a fixed charge for a battery. The customer pays so much for each mile, no matter what distance his car travels. The batteries can be exchanged in a few minutes and the mileage of the car thus is unlimited. Adoption of universal battery exchange systems is yet a possession of the future, but its possibilities are far reaching. As it is, electric charging facilities and electric garages rapidly are being installed, so that it is possible for the electric to be charged practically wherever required. Private charging outfits, also, have been put in the reach of the electric owner for use over night in making his car ready for the next day's requirements.

What attracts the show visitor most about the electric is the body. This is natural, as the electric maker has been putting so much thought into the body for all these years. You will notice that the visitor to the exhibit opens the door, looks within, often sits within and inquires into particulars as to the fittings. The exterior finish, too, is a matter of comment.

The Detroit

The new $1,775 Detroit coupe is the feature of the Anderson Electric Car Co. exhibit. The lowest priced Detroit electric previously was $2,275. The wheelbase of the new car is the same as that of the other models, 100 in. The price has been lowered by enlarging the production, cutting down the options in upholstery, using pressed steel instead of aluminum for the fenders and hoods, by eliminating the two expensive curved glass windows in the rear of the sides and by leaving out cut-glass vases, card cases and smoking sets.

This reduction in price brings the total reduction made by this company within the last two years to $1,100. The 1917 cut is $500, while those of 1916 were from $600 to $725. The new models have been in no way inferior to the old, however. Efficiency methods in production, including chain assembly and standardization of certain parts, are given the credit for the reductions. The same materials are used throughout, but these materials are being

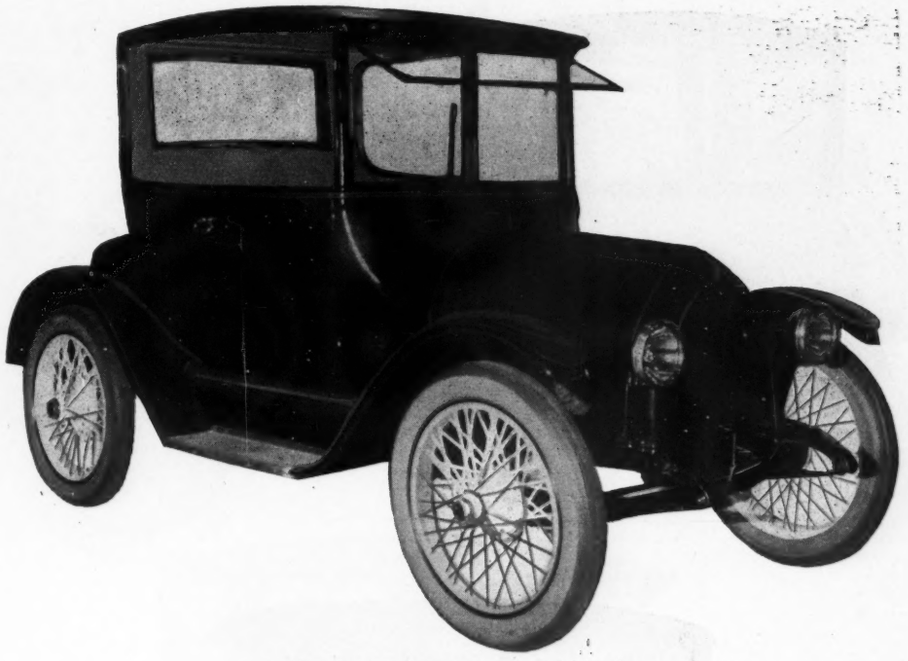
finished in special automatic machinery, and other short cuts are in force in the production.

The new model is model 68. The principle changes in it, outside of the decrease in color and upholstery options, are in tire size, from 34 by 4½ to 33 by 4½; in the spring suspension, from full elliptic rear to semi-elliptic all around; and a reduction in brake sizes and weights of minor parts, due to the general weight reduction in the new body.

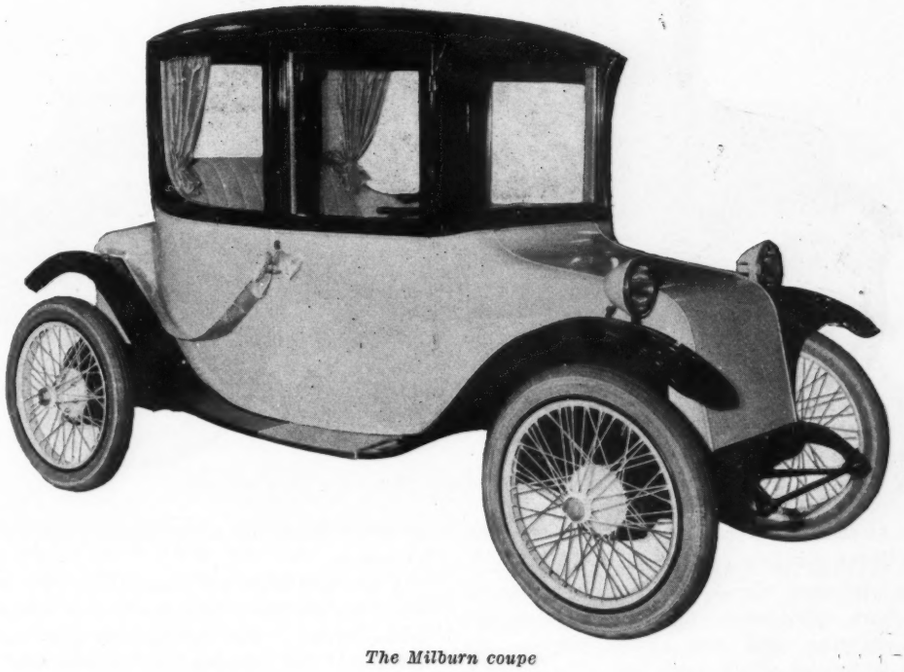
The use of leather instead of sheet aluminum for roofing has played an important part in making the price reduction possible. Not only does it lower the material cost, but it reduces the weight and, consequently, increases the mileage to a charge. Other weight-reducing features are the adoption of Hotchkiss drive in the semi-elliptic form of suspension, and the smaller wheel sizes. The lighter weight has resulted in the use of a small battery, the new one being a forty-two cell, thirteen-plate, instead of the forty-two cell, fifteen-plate, which is said to give the same mileage as the more expensive and heavy model.

The new batteries do not require washing, the purpose being to give more life as some of the active material is lost during the washing. Two sets of brakes are provided. The standard finish is cobalt blue with white stripes. The wheels are white, cream, red or blue as specified. Three selections of upholstery are possible, the choice lying in the design of the whipcord. The windows are lowered by a patent device, and the door windows are sashless. The seats are wide and comfortable, and the interior is roomy. Houk wire wheels are furnished exclusively on this model.

Of the new bodies probably the most distinctive is the Springfield type body on the Detroit model 69. This is an adaptation of the Springfield convertible principle incorporated with the brougham style of body. With the rounded style of front hood the car resembles a gasoline product quite closely. The part corresponding to the radiator has a high-dome crown effect very similar to the latest type of gasoline car front ends.



New Detroit type of semi-open coupe



The Milburn coupe

The Milburn

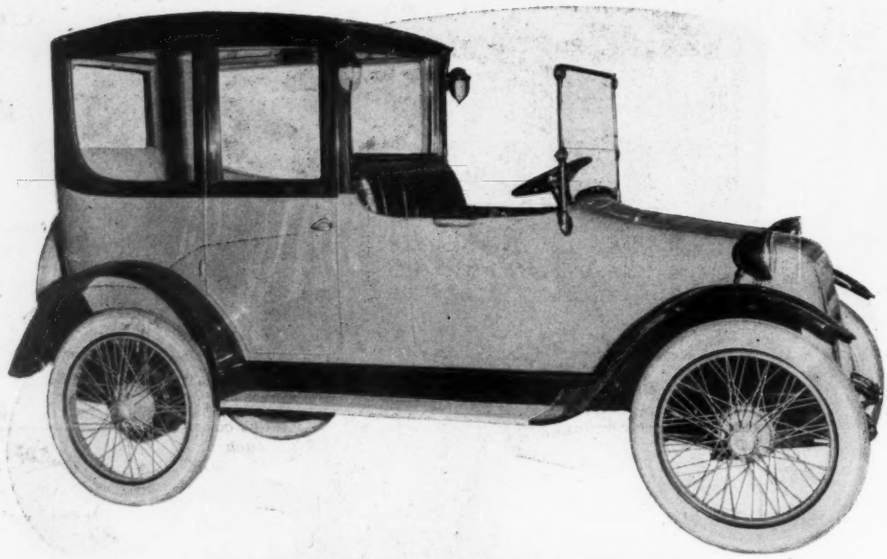
The exhibit of light electrics by the Milburn Wagon Co., Toledo, Ohio, attracted a great deal of attention by the town car, which resembles nothing so much as it does a gasoline car. Two models were offered, the town car and the brougham, or coupe, as it is called more commonly. Two coupes were shown, however.

Both models have a wheelbase of 105 in. The motor and controller are designed and built especially for the Milburn by the General Electric Co. Worm drive is used, and the springs are of chrome vanadium steel, front, semi-elliptic and rear, cantilever. As low a speed as six miles and as high a speed as twenty-three miles an hour are possible. A drop-forged I-beam axle is used in front, and a three-quarter floating axle in the rear. These are designed and made in the Milburn plant. Also, the brakes are the same and the tread is standard in each model. Otherwise, there is a difference.

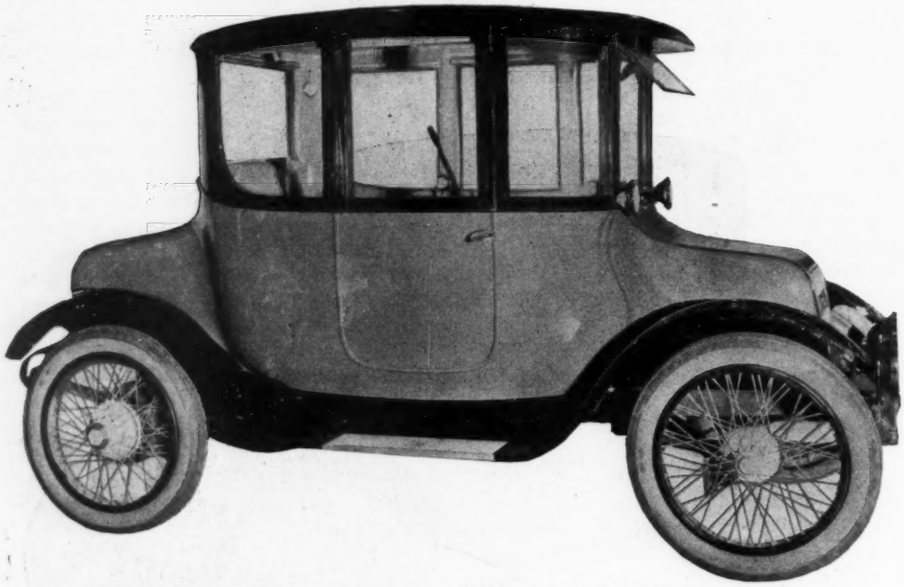
To a layman the interior of the town car is that of a gasoline car, that is, the interior of the body. A single lever on the steering wheel is the most apparent difference at first glance. The body of this model, which is known as model 30, is 146 in. Two auxiliary seats give additional tonneau room, and 41 in. from cushion seats to roof give plenty of height. The body is finished in deep royal blue with black trim, though colors are optional. The upholstery is soft finish gray wool cloth, which looks as if it would not show dust or soil easily. The driver's seat is of leather.

The batteries are forty-cell, W.T.Z.I., standard, or Edison 60-cell, G-6, which are made part of the equipment at extra cost. The steering wheel measures 17 in. and is of the worm and nut type. There is a switch for dimming the headlights, and artistically designed interior lights are used. Pillar lights and tail light complete lighting facilities.

All-Weather tires, 33 by 4, are used in the rear, and 33 by 4 European tread in the front. Wire, demountable wheels are used. A normal mileage of from 60 to 80 miles is estimated for the lead battery, or from 70 to 90 miles with Edison. Twelve of these cars have just been sold to the



The Milburn town car is much like a gasoline car



The new Ohio model, 44, comes $500 lower than last year

American Motor Livery Co., Chicago, for livery service.

Driver's signal, volt ammeter, electric horn, speedometer, tools, jack, hydrometer, charging plug and pump complete the equipment of the town car. The coupe is similar in many ways, its greatest differences being in length, tires and wheels. The body of the coupe is 138 in. long. Goodyear cord tires 32 by 3½ are used, with European tread as an option, and the wheels are artillery standard, with wire wheels optional. The town car is $1,685 and the coupe, $1,995.

The Ohio

Model 63 of the electrics manufactured by the Ohio Electric Car Co., Toledo, Ohio, has been continued. The new model is known as model 44, and its main difference from model 43 lies in the use of pressed steel for the running boards instead of hand-hammered aluminum and in changes in the body which do away with the one-piece superstructure in favor of a built-up effect which has square corners instead of round.

A new and improved magnetic control is used, and the motor is supported on a separate bracket. The voltage also has been doubled. The bushings are self-lubricating. Warner lens for dimming lights are stock. Otherwise, it is a continuation of the former features of Ohio electrics.

The substitution of machinery-made fenders of steel instead of aluminum and the square back instead of the round have made possible a decrease in price for the new model 44, which is now $2,380 instead of the former price of $2,900. Model 63 is continued at the same price, $3,250.

The reduction in the price and the change in methods of construction should not be taken as detrimental to the quality of the new models in any way. The changes make increased production possible, and the concern is putting out models of the same character practically as those of last year. The continued model is a heavier type for those who desire a large five-passenger car. The double-drive is a feature still as it was when the Ohio company produced the double-drive model as a pioneer in that type in 1912. Two sets of controller mechanism, one in front and one at the rear seat, can be operated independently of the other.

Ohio coach work features of old are retained, the body having a unity all its own through the manipulation of the various parts of the car. The oval mirror in plain sight of the driver is a small feature of every car and is designed to serve the same purpose as that in the newer spotlight with its accessory mirror. Pockets for toilet sets is another feature, though this is borne in common with other makes of both electrics and gasoline cars. The interior is roomy, and the seats are deep and comfortable.

The Rauch & Lang

The Baker, R. & L. Co., Cleveland, Ohio, has three representatives at the show. One model, known as model J-7, is represented in two different jobs. One is painted a dark apple green and has gold leaf stripes. The upholstering is in two-tone green velour. The other, differing from the first in that it has wheel steer, is painted blue and has a gray stream line. Gray whipcord upholstery is used.

The third car exhibited, which is known as model BX7, is in battleship, or motor car, as it is coming to be called, gray, with white stream line and white wire wheels.

There has been little change in the last year or two in the Rauch & Lang electrics, though the company has amplified and improved each model upon its predecessor. The same body lines are continued, with more accentuation of the old coach idea, if anything, and are more than good representatives of their type. Forty-two cells are used in the larger models and forty-one cells in the lighter types, according to former practice, and little change has been made in the mileage estimate.

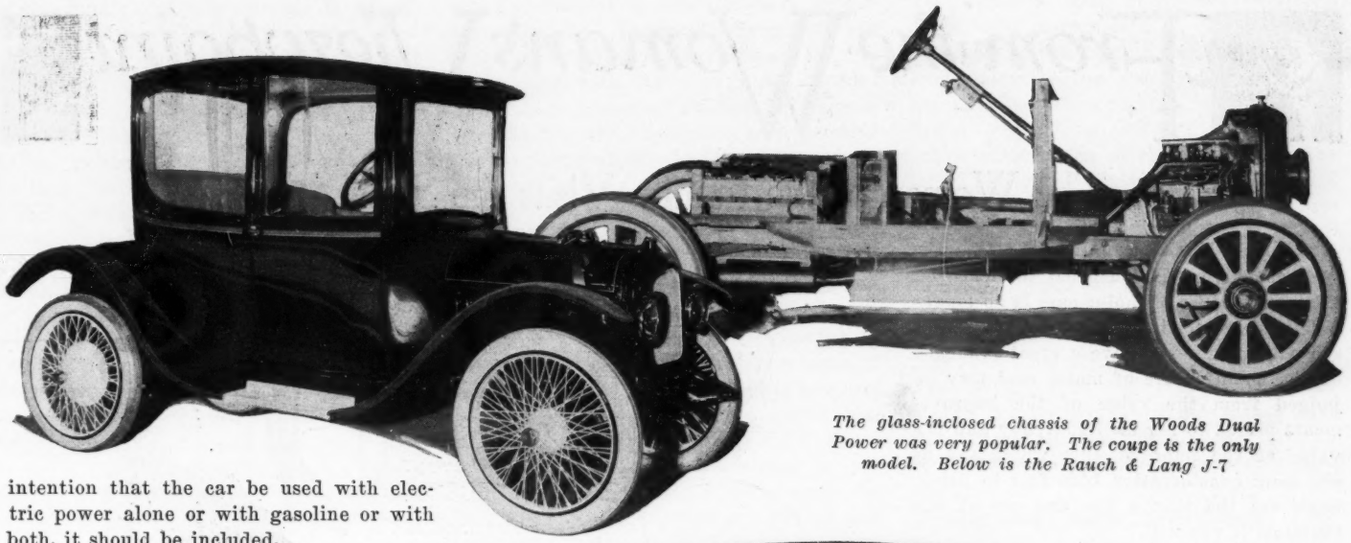
Further ease of control, freedom from adjustments and safety has been the main aim. Model J-7 is a five-passenger car and has a wheelbase of 102 in. Pneumatic tires, 33 by 4½, or cushion tires, 36 by 4½, are used. The battery is forty-two cell. The car can be driven either from the front or rear seat. It sells for $3,000.

Model BX-7 has a wheelbase of 92 in. and a battery equipment of forty-one cells. This is a single-drive car and sells for $2,800.

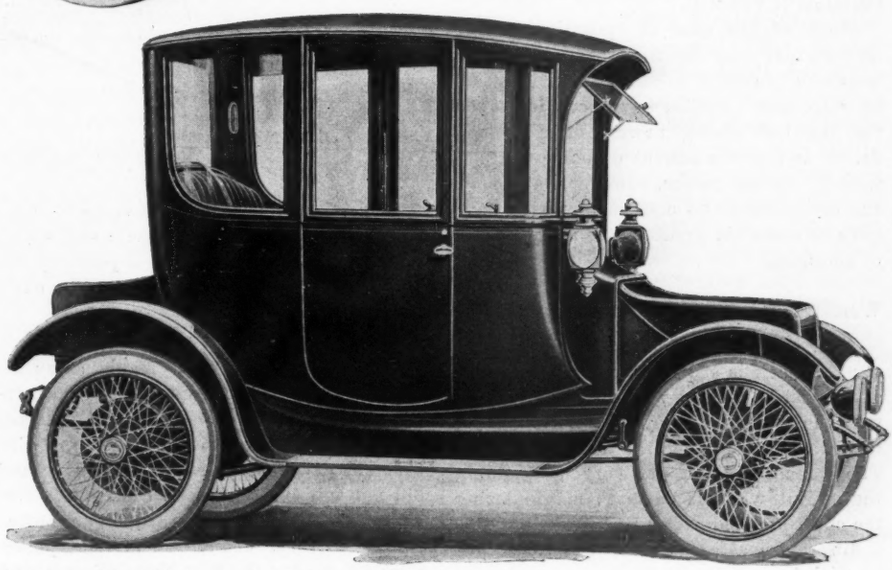
The second model J-7 on exhibit differs from the first only in finish and in method of steering. The first one has double-drive levers, while the second has wheel steer.

The Woods Dual Power

While some might take exception to ranking the Woods Dual Power with the pure electrics, the interest shown in the model at the Armory seems created as much by the electric features of the car as by the gasoline, and for this reason, together with that derived from the maker's



The glass-inclosed chassis of the Woods Dual Power was very popular. The coupe is the only model. Below is the Rauch & Lang J-7



intention that the car be used with electric power alone or with gasoline or with both, it should be included.

The Woods, the product of the Woods Motor Vehicle Co., Chicago, has features of both the electric and gasoline car. The car complete perhaps resembles the electric more than the gasoline, though no doubt this statement might be taken exception to with reason. Its operation is seemingly as simple as that of the electric. The steering wheel has two levers, one of which controls the electric features and the other of which controls the gasoline. The batteries are such as any car might have, only there are about half as many as the pure electric has. The gasoline and electrical motors are on the same drive line, and gasoline, electric or gasoline-electric drive may be used.

All operations are controlled by the two hand levers on the steering wheel and a foot pedal. With electric power alone, brought into force by one lever and the pedal, the driver can attain a speed of 20 m.p.h. By moving the other hand lever the driver has both gasoline and electric power and can attain a speed of 35 m.p.h. Also, he can fully retard the electrical control lever and run on the gasoline motor alone.

The mechanism of the car includes three units, irrespective of the drive shaft and rear axle. The gasoline engine is under the hood, and directly back of it is the electric motor, a unit in the same drive line. The storage battery set is under the front seat. The connecting unit between engine and motor is a magnetic clutch. When the gasoline control is raised about an inch from full retard the fly wheel of the engine becomes magnetized. The magnet force pulls a copper disk against the face of the flywheel and the engine and motor thus are connected.

The engine is a block-cast four-cylinder with 2½-in. bore and 3½-in. stroke. Lubrication is by a gear pump which lifts the oil from a lower chamber to a compartment around the valve tappets from which it flows by gravity to the various bearings. Ingition is Atwater Kent, automatic spark advance. Cooling is thermo syphon through honeycomb radiator. A 9-gal. gasoline tank is under the cowl. The battery is specially constructed by Exide and has twenty-four cells with eleven plates each. The rear axle is semi-floating with the wheels mounted on driving shafts which run on Bock roller bearings.

The body combines gasoline and electric car features. It is of aluminum-panel construction, and the coupe is the only model. The doors are wide, and the windows are adjustable. Four passengers find plenty of room. The instrument board has an ampere-hour meter and ammeter combined and Stewart-Warner speedometer. The price, $2,650, includes power air pump and motor-driven warning signal. Wire wheels are $25 additional, as are slip covers. Special color jobs are produced at $100 additional.

SHOW SETTING EGYPTIAN PALACE

Columbus, Ohio, Jan. 27—The annual Columbus show opened in Memorial Hall today, the setting being an Egyptian palace, which presents a very pleasing appearance. In all about thirty dealers are exhibiting sixty-five different cars at the show. The consensus of opinion among exhibitors and distributors is that the coming spring has in store the best prospects for the sale of motor cars. The general prosperity of the country is reflected in increased sale of motor cars.

ROADS 2.9 PER CENT IMPROVED

Little Rock, Ark., Jan. 26.—That Arkansas must embark upon a program of good roads to enjoy prosperity was the declaration of Gov. Brough at the Arkansas Good Roads Convention. He said that less than 2.9 per cent of the roads of the state are improved and it cost the Arkansas farmer 28.8 cents per ton-mile while it cost the Illinois or Michigan farmer less than 8 cents.

NATURAL MATERIALS FOR WORKERS

Nashville, Tenn., Jan. 26.—The State Federation of Women's Clubs is considering marking the highways through the state by its natural resources. The plan includes placing monuments of zinc, iron, copper, hardwood, marble and other natural materials. It is also planned to have each club plant at least one tree in honor of some notable American.

From the Woman's Viewpoint

The Woman of the Family Visits the Show, Too

COLISEUM, Chicago, Jan. 27—That the woman has had a great influence on the manufacture of motor cars is no longer a debatable question with the many. That she will continue to have a great influence on the manufacture of motor cars may be judged from the value of the improvements placed to her credit already and the value of the improvements which she as the main consideration bids fair to bring. Such are the things you can see at the Coliseum if you will.

Much of the ease of operation of the modern car has been a reaction of the woman's inability to shift the stiff gears of yesterday. Brakes have been improved for the less strong powers of a woman driver and to the benefit of both men and women. In the bodies, however, have come the refinements and equipment which have gone to make for greater ease and pleasure of motoring.

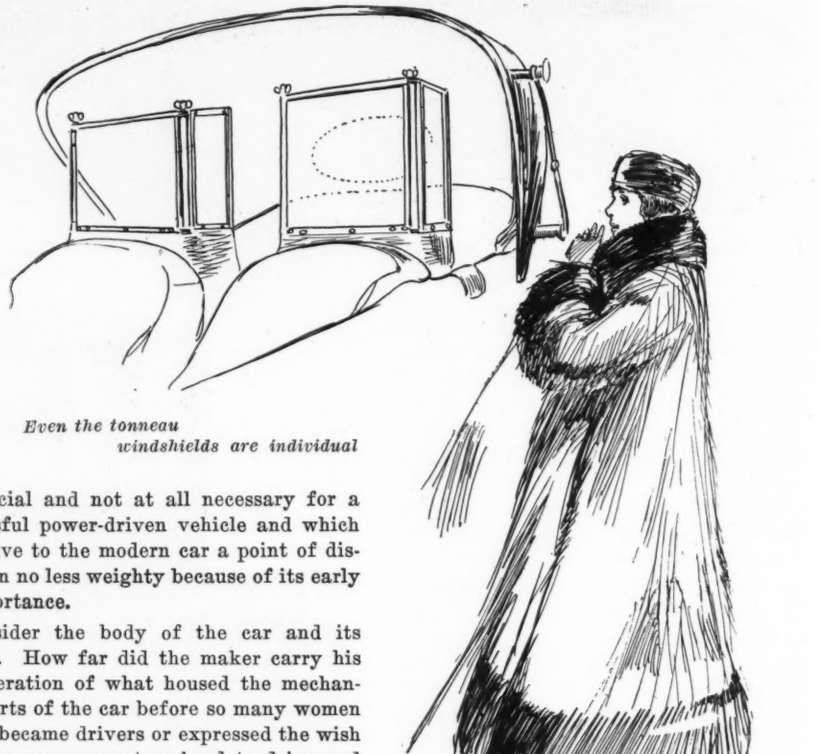
Woman Likes New Jack

And the end is not yet. The long-handled jack is still a new accessory. One of the main reasons why for it no doubt was the woman driver. It was all right to get the jack under the axle of the car. The woman did not get very dirty doing that. But when it came to manipulating the short-handled jack afterward, that was a different matter and one not to be put up with by every woman.

That the woman has played such a heavy role in the motor car manufacture is evident at the show as it never can be evident in any one place other than at a show of similar size and representative importance. The exhibits bear witness to an influence making for more ease and convenience and better artistic construction. The men in charge of the exhibits recognize the power of veto held by the woman in the family by directing much of his demonstrative talk and persuasive gifts toward the woman visitor. In no case is her ideas scorned, either in the factory or in the sale of the finished product.

Educational Models Interest All

The motor show is always interesting, whether the person who enters its doors is there because he or she wants a car or because it is some place to go to see the results of money and brains. Stripped chassis, cutaway cars, engines and countless accessories are displayed as never before, and the public has a chance to inspect them as never before. The woman is an important figure in this public because she pays attention to those things which in the beginning of car production were thought superficial and not at all necessary for a successful power-driven vehicle and which now give to the modern car a point of distinction no less weighty because of its early unimportance.



Even the tonneau windshields are individual

Consider the body of the car and its design. How far did the maker carry his consideration of what housed the mechanical parts of the car before so many women either became drivers or expressed the wish that the car was not so hard to drive and did not soil their clothes so quickly? Not very far. But today there is no better evidence of the change in the old policy than the motor show at the Coliseum and Armory is offering.

Makers Observe Individuality

More individuality is manifested by each maker. And this individuality is possible to the largest extent through color and body design. Modern cars are not so distinctly different as one might suppose on first thought. They are less different if they are assembled, as not a few excellent cars are. One may have this feature of mechanism; another has one just as big in its field. As to excellence of mechanism, if a car is anywhere near universal in adoption by the public it is of a reliability equal to that of some other car. It is the body that differentiates, for the one who is not a mechanic, at least.

Bright colors in cars have come as companions to bright colors in women's clothes. The range of choice offered in colors makes for individuality. This individuality in colors of which so much notice is taken at the show has been noticeable for quite a while. The tendency to make cars individual by the use of varied finish was strong even before then. Custom body departments have been made a part of many factories, and several dealers have added such to their concerns.

On the surface, the way men and women inspect cars at the show is this: The man looks under the hood; the woman looks at the body and top. Both has its advantages over the other, if such a paradox is permissible. If the car won't run, why have it? If you can't wear your best clothes in the car without soiling or tearing, and if it is more comfortable to stay at home, walk, or ride in a railway coach, why have it? That both methods of inspection are becoming more reconciled is evident in the common existence of running ability and body utility.

Custom Made Bodies Popular

The number of prospects who demand individual bodies for the chassis of that particular make they buy is increasing. The old custom that Europe had of selling the chassis alone and letting the purchaser reflect individual requirements in body construction is becoming an American custom, more or less. In most cases the body that is a special job is so because some woman

in the family had a preference to be followed.

The women who visit the show this year are taking full advantage of the opportunities the show offers them. Though the opening this afternoon found them greatly in the minority, their number could not be taken as a criterion of their interest. Judging from available sources of information, a larger percentage of the women who attended were there with the prospect of ultimate purchase than the percentage of prospects among men. And the women were not afraid to show their ignorance if they did not know something already about that make to which they were attracted and of which they wished to know.

When in Doubt

When in doubt, sit in it. Such might be the summary of car advice that the woman at the show follows. She is not expected to exhibit interest in the engine, and consequently she does not do so often or for long at a time. But she will try out the distance of the brakes from the driver's seat, the depth of the tonneau seats and so on.

Such advice is not bad, either. If a woman is to drive a car and get full pleasure that is any motorist's due out of driving, there are certain provisions which she must take to insure ease in driving. She never will get all that is due if the driver's seat is uncomfortable, if she cannot reach the levers easily, if the levers take a large share of her total strength. So she does these things, trying the brakes and working the clutch also.

The length of the cars at the show is of more moment to the woman visitor than one would think. She exclaims over the length of the body and the wheelbase and wonders how she could turn around with those cars. Several solve this problem by deciding not to turn around but always go around the block. This length, by the way, is considered to be one of the explanations for the popularity of the roadster, cloverleaf and four-passenger. A woman feels that she can handle the car more easily if it is shorter. However, she also prefers the long body sometimes, in which case she does as many suggest, goes around the block instead of turning.

Electric Still Draws

The electric sustains the interest it has always had among the women. Its silence, as well as the ease of its operation, first drew their preference and held it even when they wanted something that would go faster and longer. Since the gasoline car has been given the quiet motor her allegiance has been shaken, and with the doing away of the gear shift in a few makes it will be shaken further.

The cutaway exhibits at the show draws the woman's attention as it draws the man's attention. There is something impelling about action of any kind that draws the crowd, and the woman makes herself a part of the crowd at the motor show, viewing first this exhibit and then that, stopping longest at a particularly appealing model and lingering where both car and demonstration are attractive.

Mingling with the some 40,000 persons whom the management estimated were present this first day, the woman sees ensemble for the first time all the improvements she has been reading and hearing about during the last year. Many women are here from outside Chicago, and no doubt if figures of that nature were available it would be found that a fair proportion of the 20,000 out-of-town visitors are women. For often the deciding vote when the family car is in question is cast by the woman of family, and most of these visitors are here because this is the trade show of the year and they expect to buy during the week.

You will notice that the woman is very optimistic about driving a car, even if she is afraid the long car will give her trouble in turning and she will always have to go around the block. From the biggest touring car to the racer, she never doubts for an instant her ability to master the more or less intricate operations that give the driver control. She speaks with proper awe of such things as flexibility, worm and spiral-bevel drive, but if she does not recognize them as familiar acquaintances she trusts with the faith of a good sportsman in the ability of the maker to give her the best possible.

Women Like Silent Motors

The women, perhaps, are the first to prefer the quiet, smooth-running motor, and for this reason are apt to pick out the car with a well-made and well-designed engine, if proper demonstration is given. The show has that disadvantage however, which common sense gives in prohibiting the ordinary running of engines on display. Many of the women express their wish for such a demonstration, and the salesman in charge of the exhibits promptly provides for the fulfillment of this wish with appointments for demonstration with cars from the city agencies.

The woman also wants to know if the mechanism of the car is accessible sufficiently for her to learn to attend to any minor repairs. She is interested in the cowl board also, and when she looks under the body top, as she does often, the cowl board gets a certain amount of inspection. Not only does she wish to have the brakes and levers within comfortable reaching distance, but she wants a cowl board not over-cluttered with instruments of various kinds, The neater the cowl board, that is, the more smoothly the necessary instruments are attached thereon, the better pleased she is.

The substitution of the hassock for the metal footrail, as demonstrated by the 1917 cars more than by former models, pleases the woman particularly. The metal rail usually resulted in stain to light-colored shoes, and since the light-colored shoe has become so popular the disadvantages of the metal footrail have been more apparent. However, she appreciates the provisions for heating that the footrail disguises, though apparently she would rather have the footrail as an addition to the hassock, so that the footrail would pose only as a heater.

Divided Front Seats Cause Debate

The coming of the divided front seat finds a few disapprovals. The divided front seat in the two-door sedan makes for a cozy, intimate company. But it makes necessary individual robe rails, and while this is desirable in some ways it is not in others. For example, the large coat now in vogue cannot be hung on the robe rail which is merely the width of one front seat without becoming at least slightly wrinkled, if it is the wrinkling kind at all. This arrangement of the front seats in the open car also makes necessary individual windshields if tonneau windshields are provided. This, however, brings little inconvenience, as they are more or less flexible in arrangement, but the advantages of divided front seats are lost.

"Can't you induce your father to buy a sedan?"

Is Average of Human Caution Low?

Figures on Grade-Crossing Accidents in California Indicate Carelessness Is Chief Factor Responsible for Accidents

"SAFETY First," has become a by-word. There are people who carry a pennant on the wind-shield of their cars with the words "safety first," in letters of gold, yet, who will race a railroad train to see which shall be first to reach a grade-crossing.

Safety first, to many, means nothing. It has become a joke. Within the last few weeks, in southern California, a driver, who should have been in a lunatic asylum instead of driving a motor car in which were a dozen or more people, brought instant death to five persons, himself among the number, and serious injury to several others, in attempting to cross a railroad track ahead of a rapidly approaching train. He saw the train, too—had an unobstructed view of it for nearly half a mile. He speeded up his machine and raced with the train for the crossing, both reaching it at the same moment, with the result stated. Who was to blame?

A Case in Point

The average of human caution is surprisingly low. There may be some who will be inclined to dispute this statement, but official statistics prove this to be the case. A few days ago I was walking along the principal- avenue of a western city. I heard the rattle and clatter of an approaching electric train. The noise was accompanied by the constant clanging of a gong on a car at the head of the train, which could be heard for half a mile. A flagman stepped out from his little house at an important crossing, waving his flags in either hand, warning all who chanced to be near of the impending danger. At the same moment a motor car was being driven along the crossing street at a speed of perhaps 20 miles an hour. The driver must have seen, if he did not hear the train, but seemingly gave no heed to it whatever, until the flagman ran directly in front of his car, loudly shouting, "Hey,—Look out!"

The motorist then put on the brake, stopping within 3 ft. of the track. The motorman of the train, meantime, seeing the imminent danger, had, at the last moment, thrown on the emergency brake, bringing the passengers from their seats in a sudden and unceremonious manner. The train stopped within 10 ft. of the motor car, then moved slowly ahead, the motorman and motorist glaring at each other as the train passed.

A tragedy had just barely been averted by the prompt action of the flagman and the motorman. The motorist wore the air of a man whose personal privileges had been encroached upon.

Trying to Beat a Train Over Crossing Fool-Hardy Practice That Should Be Made Misdemeanor

Do not think this is an isolated case for it is not by any means. Listen to this, which is from an address by the Hon. A. Gordon, a member of the California railroad commission, delivered at a recent banquet.

"During the three years ended June 30, 1915, 249 people were killed and 1093 were injured at grade-crossings in California. During six months ended Dec. 31, 1915, sixty-five people were killed and 222 injured. During the first three months of 1916, thirteen people were killed and seventy-five were injured, and the record for summer is worse than that for winter.

"California, with less than 4 per cent of the population of the United States, and with less than 2 per cent of the steam railroads, furnishes nearly 5 per cent of the deaths and injuries resulting from accidents at grade crossings on steam railroads."

Here is another statement made by Mr. Gordon that is almost unbelievable, and still, it is of undoubted authenticity. "The Southern Pacific Railroad reports that during the last two years 525 of its crossing-gates were broken by vehicles when closed."

Is the average of human caution low? Just consider the following figures for a moment and judge for yourself:

The Southern Pacific, which has been systematically investigating the causes of accidents at grade-crossings, ascertained through its observers, stationed at thirty-four crossings, the following facts:

Of over 17,000 motor car drivers observed, 69.5 per cent looked neither way before crossing the tracks; 2.7 per cent looked in one direction only, and but 27.8 per cent looked both ways. Of these, 3300 drivers, or 19.3 per cent, ran over the tracks at reckless speed. Only thirty-five drivers, or two-tenths of 1 per cent, stopped their machines before crossing the tracks.

There were also observed 4900 drivers of teams, of whom 39.4 per cent looked in neither direction on crossing the tracks; 8.6 per cent looked one way only, and 52 per cent looked in both directions. It will be observed that, according to these figures, drivers of teams have nearly twice the caution of motorists, due, possibly, to less confidence in the team than the driver has in his machine—and in himself.

Nor are the drivers of teams and cars alone in this lack of caution, for out of 6300 pedestrians observed 49.1 per cent, about one-half of the total number observed, looked neither way; 15 per cent looked in one direction only, and 35.9 per cent looked both up and down the track before attempting to cross.

The numerous accidents are due to various causes. A careful tabulation of grade-crossing accidents during the last five years in California gives the following interesting results:

	Killed, per cent	Injured, per cent
Ignored train and its warning	35.0	37.1
Ignored train and its warning, and warning of crossing-bell, automatic and human flagman and warning of other persons	13.8	12.6
Ran into the side of the train.	10.1	15.3
Stalled on the track	7.8	4.2
Tried to beat train to crossing	16.0	9.3
Other causes	17.3	21.5
Total	100.0	100.0

In the State of California there are no less than 10,000 grade-crossings of streets and highways over railroads. There are a comparatively few crossings where vehicles pass over the tracks on viaducts, bridges, or other similar structures, or beneath them in subways. It is estimated that the cost of changing a single grade-crossing to one of the over or under type, would be about $30,000. So, to make all grade crossings in California safe in this respect, it would cost about $300,000,000, which is an expense that would bankrupt the railroads should they be compelled to meet it.

Los Angeles Experimenting

In the city of Los Angeles an experiment is being tried in the hope of decreasing grade-crossing accidents. This consists in constructing a gutter-like depression across the street or roadway a short distance from the railroad tracks. This device is calculated to cause drivers to bring their cars to a standstill, or, at least, to slow down to a speed which will admit of crossing the gutter without wrecking the car, and this, it is argued, will greatly lessen the probability of the machine colliding with passing trains. Doubless these gutters will be the cause of an abundant and varied profanity, but if the scheme is successful it will save the lives of many human beings.

The most effective remedy, it seems, lies in educating the people to the danger,

the foolhardiness, of crossing railroad tracks without looking both ways, and then, not attempting to cross the track if a train is approaching within a distance which involves any element of danger. One of the best suggestions thus far made, looking to a decrease of accidents of the kind mentioned, is the enactment of a law requiring all drivers of cars, teams, and vehicles of every description, to drive slowly upon approaching a railroad crossing. Most of the accidents occurring at grade-crossings are known to have taken place when the vehicles were running at anything but a moderate speed, and if the law required the drivers of machines to come to a stop, before crossing the track, without doubt, the toll of human life due to accidents on grade-crossings would be materially reduced.

There are other ways of incurring injury, or of meeting death on rail road tracks, than those that occur at grade-crossings. One of these is walking on the railroad right of way. Thousands of persons commonly walk on railroad tracks, and particularly where taking the track admits of making a short cut. Official statistics show that in the United States, during 1914, no less than 5396 persons were killed, and 6176 were injured while walking, or, at least, trespassing on the railroad right of way, and it is stated that the figures for that year were not higher than usual. According to this, about 11,500 persons are annually killed or injured while trespassing.

In the past twenty-five years, according to Mr. Gordon, over 212,000 people have been killed in the United States in railroad accidents, and of this number, which would have constituted a very respectable army before the present war in Europe, over 112,000 were trespassers. One would naturally think that by far the greater number of these unfortunates were tramps and hobos, but such is not the case, for 75,000 of them were citizens who lived in the immediate vicinity of the scene of their death, and of these not less than 13,000 were school children under the age of eighteen years.

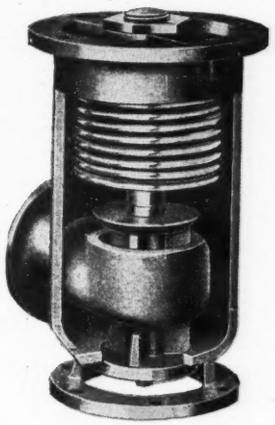
HARTFORD AMPLIFIES TRAFFIC CODE

What may be regarded as the first step in the absolute regulation of traffic in Hartford, Conn., is the restriction of streets in the business district to vehicles bound in one direction only, east or west. Dec. 27 the Common Council approved a resolution covering the situation which is now effective. All traffic on Asylum street from Main street to High street, a distance of 2000 ft., is confined to the west. All traffic on Pratt street 600 ft. long is easterly. All traffic on Kingsley street, 450 ft. long is west and on Temple street, 450 ft. long, is east

The fire department is living up to the requirements while as a matter of fact it could be considered immune because of the peculiar nature of its business. All vehicles are ordered to keep to the right side of the road, those moving slowly as close to the curb as possible, this because the fire department has a habit of traveling fast and needs the room. All cars may now draw up to either curb in the one-way area but must be headed in the general direction of traffic. Other streets are under consideration for similar treatment as for instance Church and State streets.

An effort will be made in this session of the legislature to provide a penalty for the drivers of horse vehicles who do not display a light at night. The present law requires a light but there is no provision for fine in case of violation.

Winter Cold and Motor Heat



Sylphon regulator with shell cut away. The upper valve is for overflow and the lower for radiator water

IT'S all right in the summer time, but what about winter? That question has confronted designers of motor cars for a number of years and its application is to the method of regulating the temperature of the engine. It is granted that an engine burns less gasoline, gives more power and is all around more reliable when it is operating at an approximate fixed temperature. Gas entering a cold engine receives a cold welcome, and in discouragement it condenses and strays back down the manifold in liquid form or otherwise fails to burn. If the motor is too hot the lubricant burns out, the metals become unduly expanded, and what may happen can be termed in the maximum with a cracked cylinder or broken connecting rod, and in the minimum with a generally indisposed engine operation.

The Chicago motor car show displays three interesting developments along this line. One is the thermostatic method of water-heat control. In this system an automatic-operating device is inserted in the water line between the engine and the radiator, the function of which is to keep the water in the engine until it has arrived at the efficient operating temperature and then let it circulate through the radiator at a rate which will maintain, closely, this efficient operating temperature.

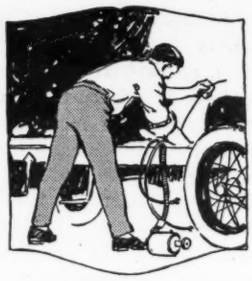
Another method is that used by Hudson and the new Columbia. It is the cooling air that is tackled with this system, instead of the water, although it operates to gain the same end, namely, to keep the engine at an efficient operating temperature. On the front of the radiator is provided a shutter—just like the blinds one finds on the old colonial houses. This shutter may be opened and closed at the will of the driver, from the dash, cutting off the air supply. In conjunction with a Boyce Moto-Meter the driver can so regulate the shutter that the liquid in the Moto-Meter tube will stand at the efficient temperature mark at all times.

The third method is the use of the Boyce Moto-Meter either in conjunction with the radiator shutters, as described above, or with the use of radiator covering and hood covering to retain the heat in cold-weather driving. This little instrument, which is screwed into the filler cap of the car, tells the driver at a glance just how his motor is acting as far as heat is concerned. Incidentally, one of its big functions is letting a man know when his oil supply is exhausted while there is yet time to save the engine from serious damage. If the Boyce instrument shows that the heat is mounting excessively and in a short time, the driver can look to his oil supply first, then if everything is all right there he can turn to the fan, water pump, etc. Without it his first knowledge of something wrong comes when the engine begins to pound.

Reverting to the thermostatic principle of water regulation. The Sylphon regulator, made by the Fulton Co., is finding its way into many of the more costly cars. Among the users of this instrument are: Cadillac, Chalmers, Haynes, Marmon, Packard, Premier and Westcott. The Oldsmobile uses its own system.

The Sylphon regulator consists of a thermostat coil and a valve housed within a unit which fits into the water line. For application to pump systems it is placed on the bottom water line. For application to thermo-syphon systems it is placed on the top water line. It is connected to a by-pass hose which runs from the thermostat box to the opposite hose line in back of the radiator. When the engine is cold the thermostat coil is contracted and the valve between the motor and radiator is shut. The water is then by-passed through the auxiliary hose and sent back into the engine without receiving the cooling effect of the radiator. As the water becomes heated the thermostat coil expands, opening the valve in proportion to the increase in heat until the efficient operating temperature is reached. Should the water temperature start to recede from this efficient mark, then the valve in the regulator begins to close and part of the water is by-passed directly back into the cylinder.

Electrical Equipment of the Motor Car



By David Penn Moreton & Darwin S. Hatch.

Editor's Note—Herewith is presented the twenty-ninth installment of a weekly series of articles which began in Motor Age issue of June 29, designed to give the motorist the knowledge necessary to enable him to care for and repair any and all of the electrical features of his car, no matter what make or model it may be. At the conclusion of this series, "Electrical Equipment of the Motor Car," with additions, will be published in book form by the Class Journal Co., Chicago, in a size to fit the pocket conveniently. It is expected that the book will be published about April 1.

WHAT HAS GONE BEFORE

The fundamentals of electrical circuits of the motor car were explained through their analogy to water systems and the relations of current pressure and resistance brought out. This was followed by an explanation of series and multiple circuits, and how electricity is made to do work in lighting, starting, signalling, etc. Calculating the capacity of a battery for starting and lighting and the cost of charging storage batteries and determining the torque a starting motor must develop were explained. Action of primary batteries and dry cells was taken up, and the best methods of connections. A separate section was devoted to the makeup and action of lead and Edison storage batteries, and another to the care of lead batteries in service and best methods of charging them. Magnets and electro-magnetism then were considered and the principles of generators and motors explained. A section on generator output was followed by one on the purpose and operation of the cutout. The section on Electric Motors began in the issue of Dec. 14.

Part XXIX—Electric Motors

THE relative positions of the commutating planes for a generator and a motor are shown in Fig. 180, the full line representing the commutating plane of the motor and the dotted line representing the commutating plane of the generator. The direction of current in the armature wires corresponds to the motor connections, and the direction of rotation will be as indicated by the curved arrow. The wires between the two commutating planes on one side of the armature can be thought of as being in series with the wires between the two commutating planes on the opposite side of the armature and forming a number of complete turns about the armature core. The remaining wires may be thought of as forming a second set of turns. The product of the turns in the angle between the commutating planes and the current in each of these turns gives the value of what is called the demagnetizing ampere-turns, because their effect is to produce a weakening of the magnetic field of the machine. The product of the remaining turns and the current they carry gives the value of what is called the cross-magnetizing ampere-turns, because they act at right angles to the magnetizing effect of the field current of the machine. The turns in the angle between the commutating planes are called the demagnetizing, or back, turns and the remaining turns are called the cross turns.

Commutation

The process of commutation can be explained by reference to a simplified diagram of the armature winding as shown in Fig. 181. The commutator segments are marked C1, C2, C3, etc., while the various parts of the armature winding called elements and marked 1, 2, 3, etc., are shown connected in series, the terminals of these elements being connected to the commutator segments in regular order. The position of the neutral plane is represented by the line AC, the direction of rotation by the large curved arrow, the direction of the polarity of the part of the pole shown to the right by the letter S; and the current in the various elements of the winding by the small arrows. With the direction of current in the elements of the armature winding corresponding to that shown in the figure, the brush B must be negative in the case of a motor.

As the armature rotates the commutator segments in turn pass under the brush, and if the arc of contact of the brush on the commutator is greater than the width of the insulation between the commutator segments, which always should be the case, then an element of the armature winding will be short-circuited when the brush is in contact with the two segments to which the terminals of the element are connected. When an element becomes short-circuited by the brush it is no longer directly in series with the elements of the armature winding to its right or left, and the current in the element will drop to zero value, provided there is no electromotive force induced in the element, or it is moving parallel to the magnetic field. It does not do so instantly on account of a property of the element, called its inductance, which tends to prolong the current. As the armature rotates one of the commutator segments to which the short-circuited element is connected moves out from under the edge of the brush and the short-circuit on the element is removed, and the element becomes a part of the circuit through the armature to the left of the brush. When the element which was short-circuited becomes a part of the left-hand path through the armature, it must carry the same current the other elements in that path carry, regardless of the value of the electromotive force being generated in the element, because they are all directly in series. If the short-circuited element has zero current when the short-circuit is removed by one of the segments moving from under the brush, the current in the element must increase almost instantly to a value equal to the current in the elements in the left-handed circuit through the armature. A property of the element, inductance, opposes this sudden increase in current, and as a result there is a tendency for an arc to form between the edge

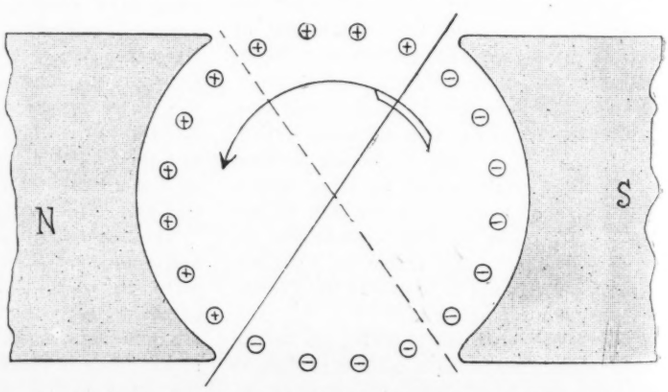


Fig. 180—The two lines show the relative positions of the commutating planes of a motor and a generator

of the brush and the commutator segment which is breaking contact with the brush until the current in the element whose short-circuit is being removed has reached its proper value, or the inductance of the coil has been overcome. This condition of affairs would result in a continuous sparking at the brushes, which would not only represent a loss but would be injurious to both the commutator and the brushes.

Sparking due to the cause just mentioned can be reduced and practically overcome by moving the brushes back of the neutral plane. When the brushes are thus changed, an electromotive force will be induced in the element of the winding while it is short-circuited, and this electromotive force will be in a direction such as to produce a current in the element in the same direction as the current in the elements to the left of the brush. The induced electromotive force in the element which is short-circuited also causes the current in the element, when it comes into the short-circuited position, to decrease to zero value in a less time than it would if there were no induced electromotive force in the element. The above results, due to the effect of the induced electromotive force in the short-circuited element, indicates that the inductance of the element is overcome while it is short-circuited, and a current of the proper value will be established already in the element when it becomes a part of the left-hand circuit. Moving the brushes back of the neutral plane results in a decrease in the turning effort the armature is capable of producing, but this is more than offset by the advantages of better commutation.

The winding which has been used in explaining commutation is perhaps the simplest form possible, but the fundamental principles involved are practically the same in every case.

In certain types of lap windings the elements are connected to segments which are not adjacent to each other but may be several segments apart. In such a winding, it is necessary that the arc of contact of the brushes cover several segments in order that the various elements may be commutated properly. The time of short-circuit of the different elements must be such that it is possible to reverse the current in the element.

In the case of wave windings, the elements are connected to commutator segments which are approximately 360 electrical degrees apart, and instead of an element being short-circuited by a single brush, as in the lap winding, it is short-circuited by two

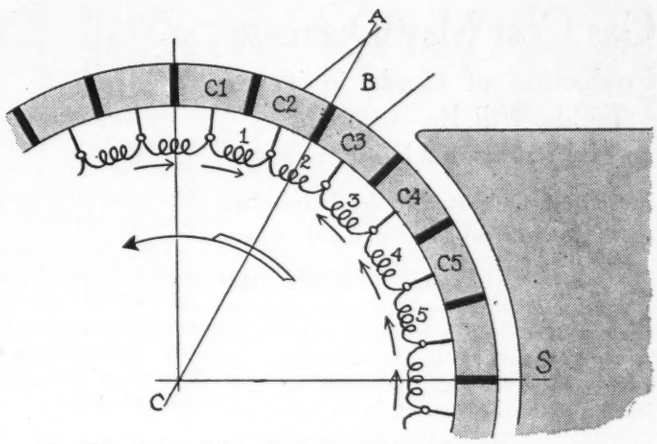


Fig. 181—Reference to this figure explains the process of commutation. The line AC represents the neutral plane

brushes of the same polarity, these brushes being connected externally by a heavy conductor, called the brush ring.

The brushes on a machine may be adjusted to give practically perfect commutation for a given field current and armature current, but if either the field or the armature current, or both, change in value, there will be a change in the degree to which the resultant magnetic field of the machine is twisted, and, as a result, the commutation will not be as satisfactory as before the change. To have as good commutation as possible at all times, it would be necessary to move the brushes whenever the position of the neutral plane is changed.

Commutation is improved somewhat by increasing the resistance of the short-circuited element, though there is a slight decrease in efficiency, due to the introduction of this resistance in the main armature circuit. When the resistance of the short-circuited element is increased, the current can be reversed in direction in a shorter time than with the lower resistance. Carbon brushes have the advantage of giving better commutation than copper brushes, as they offer a higher resistance in the path of the short-circuited element than the copper brushes do. They are sometimes copper-plated to reduce their resistance in the main circuit of the machine.

1917 Show Chicago's Biggest

(Continued from page 9)

Several cars and a number of trucks and truck-forming attachments are being shown outside the regular exhibition buildings. At 1512 Wabash, which is almost across from the Coliseum, is shown the Comet made by the Comet Automobile Co., Decatur, Ill. This is a six-cylinder car and a roadster, five-passenger touring and a stripped chassis are shown. The new Nelson car is also shown here in the stripped chassis form and the Dependable truck by the Maxfer Truck and Tractor Co., described elsewhere in this issue, together with the Selden truck and the Northway trailer are being exhibited in this building also. In the alley leading from the Coliseum to the Armory are a number of exhibits, chief among them being that of the Smith Motor Truck Corp. Its truck-forming attachments for Fords and other cars are demonstrated and a part of the exhibit is housed in a unique building, the walls being constructed mostly of glass. One lone car—a Madison five-passenger touring car—bids for attention from an alcove off the alley opposite the entrance to the Coliseum from the Armory. Its booth is sky covered.

Several of the hotels are housing exhibits this week, the New Southern having the new Colonial, made in Indianapolis, and the Globe and Indiana trucks. The Roamer has an exhibit at the Blackstone and a number of minor accessory exhibits also are being shown there. Velie has a five-passenger car on display at the Sherman House which is the same as one of the cars shown at the Coliseum, while the Bour-Davis is being exhibited at the Hotel La-Salle.

Many dealers are expected from all points of the middle west and almost every exhibitor has arranged luncheons, banquets and meetings for their dealers and sub-dealers during the week. Thursday night the Chicago Automobile Club will be the scene of the American Automobile Association dinner when the championship awards will be made. Dario Resta and Johnny Aitken together with other race drivers will be present, while Eddie Rickenbacher, who took the short end of the Bosch and Goodrich championship reward in 1916, will be there by proxy only since he is now in Europe, his mission being to obtain racing mounts for this year's racing season.

As a special feature during show week, the Elgin Motor Car Corp. has leased the Strand theater for the week and is devoting it to publicity and entertainment in which moving pictures of the Elgin factory and Elgin cars in numerous stunts are the theme. The company throwing the doors of the theater open to its dealers and friends.

The week of dealers' conventions and dinners was opened by the Oakland Motor Car Co., Sunday, with a dinner at the Chicago Athletic Association at which the new members of the Oakland organization were introduced to the Oakland dealers and the press. There were about 60 present.

TO DOUBLE FISK PLANT

Chicopee Falls, Mass., Jan. 26.—The plant of the Fisk Rubber Co. will be doubled in the near future by the addition of a mill building. It is 60 by 105 ft., and and six stories high.

Gas Cost May Decrease

Production of Crude in Texas Fields Will Be Augmented by Additional Refineries

Increased Output Should Have Influence on Price of Fuel

AUSTIN, Tex., Jan. 27—Besides the notable increase of the production of crude oil that has been shown in the different fields of the Gulf coast region of Texas during the last few weeks, another feature of the industry which may have an important bearing on the gasoline trade of the country is the extensive preparations that are being made for enlarging the refining facilities in this state. No less than six refineries ranging in capacity from 10,000 barrels to 60,000 barrels of oil are now either in process of construction or are being planned for the near future. The refinery which the Galena Oil Co. is building near Houston, it is said will be one of the largest in the United States. This is a Standard Oil project.

Authoritative announcement has also just been made that the Crystal Oil Co., which is closely affiliated financially with the Sinclair Oil and Refining Corp. of Oklahoma, has purchased a site on the ship channel near Houston where it will build a refinery and export terminals. This proposed plant will cost approximately $2,500,000 and will have a daily capacity of 60,000 barrels of oil. It will be connected with the Mid-Continent oil fields by means of an 8-in. pipe line which will be laid at a cost of about $5,000,000.

The Union Sulphur Co., which is also regarded as a subsidiary of Standard Oil, is prepared to build a large refinery near Beaumont.

The Pierce-Fordyce Oil Association is arranging to double the capacity of its plant at Texas City and will probably erect an additional one at some other point in the state.

Two small refineries will be built in North Texas, one in the Electra field and the other in the Burkburnett field. It is reported that the Magnolia Petroleum Co. also contemplates building another refinery which will probably be located at or near Houston.

FAETH HEADS N. A. A. A. J.

Chicago, Jan. 27—The finishing touch was put on the National Association of Automobile Accessory Jobbers at the convention held in the Congress Hotel from Wednesday until to-day. The organization, which began 18 months ago, with a dozen members, was rounded into shape and made a fully-completed working unit.

The sessions were devoted to discussions of minor points, the smoothing out of wrinkles in connection with the organization's major activities and to the laying of plans for development.

One of the most important phases of this week's work was that of trade betterment. The associtaion is now advertising its aims and work in trade publications and has a committee of state chairmen whose duty it is to assist the dealers and garagemen in various states to organize and work.

The new president is Charles E. Faeth, of the Motor and Machinists' Supply Co., Kansas City, Mo.

Kansas Motor Laws

Legislator Would Prohibit Sale of 1300-Lb. Car Unless Geared to Very Low Speed

Personal Property Tax Exemption May Be Changed Materially

TOPEKA, Kan., Jan. 26—The tremendous increase in the use of motor cars in Kansas is sufficiently indicated in the number of bills concerning them in the Kansas legislature. The most important measures have to do with good roads, promoted by car owners and dealers, but many minor ones have quite as much interest and importance for individual owners. George W. Day of Meade, has introduced a bill to prohibit the sale of any car of 1300 lb. unless it is geared to run at no greater speed than twenty-five miles an hour. Another member would amend this bill, by requiring an automatic brake, that would bring the car to a sudden stop as soon as a speed of twenty-five miles an hour was attained.

The question of exemption rights in motor cars is receiving much attention. One bill gives the garage man the right of lien on a machine for repair and garage bills. Another, protects the garage man from fraud.

The lower house has passed a bill entirely rewriting the statutes covering personal property exemptions of widows, because of the motor car. This bill provides that a widow whose husband leaves an unencumbered car, need not give this piece of property up to creditors of the estate.

Photo by Kaufman, Weimer & Fabry, Chicago

Dinner of the National Association of Automobile Accessory Jobbers in Gold Room of Congress

The Motor Car Repair Shop

WHEN A CONE CLUTCH SLIPS

There Is a Method of Washing Plates Right, Which, If Properly Done Is Very Effective

IT occasionally happens that a car is brought into a repairshop with a complaint that the clutch slips in starting, takes hold too slowly, etc. When a disk clutch of the running-in-oil type begins to slip the trouble is generally due to bad adjustment, too much oil, or an oil of too heavy a grade. To treat a slipping clutch of this kind one should turn the flywheel over until one of the oil plugs can be removed, pour in about 1 pt. kerosene oil, replace the plugs, then have someone turn the engine over very slowly, possibly with the starter, while the clutch is worked in and out for a few minutes. In this way the kerosene comes in contact with all of the internal mechanism of the clutch and letting the clutch in and out forces the kerosene in and out between the disks, thus washing away the sticky oil.

Some repairmen endeavor to clean the clutch in the above manner, but instead of turning the engine over slowly by hand, or with the starter while the clutch is being worked in and out, they do it while the motor is running under its own power, ignoring the fact that as the clutch revolves at such speed that the oil is held to the sides of the case and therefore does not flush the plates as it should. This method will meet with fair success however, if a sufficient amount of kerosene is used. After the clutch has been thoroughly flushed, drain off the mixture of oil and kerosene and flush out the housing with a few gunfuls of gasoline, then refill with the required amount of oil.

Another Cause of Slip

Another cause of clutch slippage is the glazing of disks. This occurs more frequently with dry-plate types, but the oil-bath types are not entirely immune. By frequent manipulation of the clutch, the bulk of the oil is forced off of the clutch by centrifugal force and what remains is rapidly burned by friction, forming a glass-like surface of carbon which greatly impairs the adhesion of the disk surfaces. When this condition is found mere flushing out with kerosene will not answer, for although kerosene will cut the glaze to some extent, it will immediately harden again if not removed.

To remedy this, after the old lubricant has been thoroughly cleaned out, the engine should be run at a moderate speed, and with the gears in mesh and the hand brake set, the clutch should be worked in and out almost stalling the motor at each partial engagement. This will rub the carbon, loosened by the kerosene, off of the disk faces and centrifugal force will carry it to the outside where it may be readily washed out.

Making Gaskets

The gaskets between the bases of the cylinders and the crankcase or similar joints are often made by stretching drawing paper or wrapping paper over the base of the cylinder and while holding the paper firmly in place with one hand, operating a machinist's hammer by tapping the round end of the hammer around the edge of the casting. This will cut the gasket out to the exact outside shape required. This method is often employed in making gaskets for aluminum parts, but results in damage to the castings if one is not particular how he performs the operation. Aluminum is soft and the edges may be very readily broken down.

To make a gasket for an aluminum case the paper should be pressed over the bolt holes and edges of the case so that an impression is made that can be easily seen. The gasket can then be easily cut out with a pair of scissors or a knife and much less time than would be required to do it with a hammer. Grease should be spread over the aluminum before the paper is applied to make the paper adhere to the metal.

Lead, copper and asbestos gaskets for flange connections of the manifolds can be made easily with the round end of a machinist's hammer in the same way paper gaskets are made. In making gaskets from wire asbestos sheet packing, the hammer cannot be used to advantage and it is better to cut them out with a pair of tin shears.

Determining Oversize Tires

Determining the oversize of a certain tire is a simple matter and may be done mentally. We can explain the method best with a concrete example. A 34 by 4-in. tire has 4 in. of tire on two opposite sides of the wheel, making the total tire thickness 8 in. This subtracted from the diameter of the tires, gives 26 in. as the wheel diameter and the inside tire diameter. Any other tire with an inside diameter of 26 in. will fit the same wheel. A 35 by 4½-in. tire has 9 in. total thickness and this subtracted from 35 gives 26 in. for the necessary wheel diameter; hence, a 35 by 4½-in. tire is the oversize for a 34 by 4. In all cases then, subtract twice the tire cross-section from the tire diameter to get the wheel size or inside tire diameter.

Tire Hints

When there is no cement at hand in an emergency case, a good adhesive may be made by dissolving small pieces of rubber in gasoline or benzine. When on the road it is sometimes a difficult matter to obtain small pieces of rubber and in an absolute emergency, especially at night, motorists have resorted to cutting off small strips from a tire casing.

Give Us Your Ideas

MOTOR AGE readers are constantly devising little kinks and methods whereby they save themselves considerable unnecessary labor when performing repair operations about their cars. Why should these go unheard of by our readers? If you love your neighbor as yourself, let him have your ideas through the columns of MOTOR AGE.

You may have some simple method of cleaning spark plugs. You may have some simple, possibly crude, tire tool of your own invention which does the work the way you think it should be done. You may have built a motor stand for a garage, a jack, a thousand other things. If you find these useful, why should not others?

You may have become so proud of that device you built that you took a photograph of it. Send us the photograph with a description. If that is not available draw a rough sketch of it and indicate in your description what that sketch is all about. If we think the device is of merit, it will appear in MOTOR AGE with your sketch, no matter how poor, transformed into a drawing by MOTOR AGE draftsmen.

Do not limit it to material things only. Let us have your hints on proper methods of cleaning the car and its parts, simple ways of adjusting the motor, the carbureter, etc. If you know how to do it tell the MOTOR AGE repair shop. If you do not know how to do it ask the MOTOR AGE clearing house.

The Readers' Clearing House

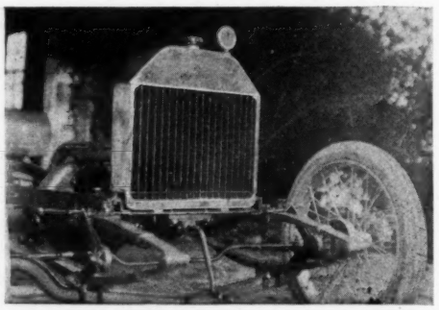
Ford Frame 7 In. Nearer Ground

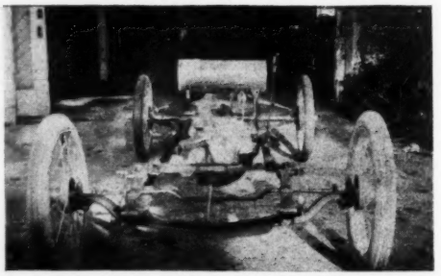
OAKLAND, Cal.,—Editor MOTOR AGE—Complying with your request in MOTOR AGE I am sending you views of a Ford cut down. Fig. 1. The frame was bent up in back so that it was lowered 7 in. Brackets were fitted at the front and full elliptic springs were used. The front cross member of the frame was taken out and a flat one put in its place. A Maxwell front axle was used and bent up 4 in. bringing the wheel centers up near the frame.

The plug on the gearset case was sawed off and a new one welded in, giving the car more road clearance. A Bosch magneto and new carbureter were fitted, giving the car more power and smoother running qualities.

It is surprising how well this car goes over rough roads and holds the ground when taking turns at excessive speeds. To Ed. Sather must be given the credit for the ideas incorporated in this chassis, and a great deal of the work was done by him. —J. W. Martin, 101 Peralta Apts.

Full Elliptics Fitted in Front—Maxwell Front Axle





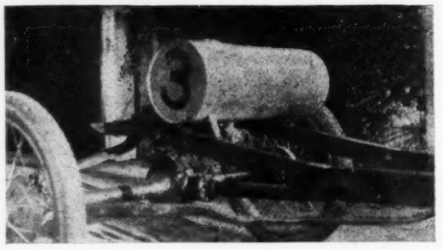


Fig. 1—Three views of J. W. Martin's rebuilt Ford which has been considerably transformed for speed purposes

DELCO WIRING AS USED ON BUICK

Model B-24 Bore, Stroke and Gear Ratio—No Clutch Brake

Muskogee, Okla.—Editor MOTOR AGE—Publish a diagram of the Delco wiring system used on the Model B-24 Buick.

2—What is the bore, stroke and crankshaft speed of this motor?

3—What is the gear ratio on high speed?

4—Does this model Buick have a clutch brake, and how is it adjusted?

5—Does MOTOR AGE think it possible and practicable to install a higher gear ratio with a lighter body and not sacrifice power to a detrimental degree?—Marion Scott.

1—The diagram you ask for is shown in Fig. 3.

2—Bore, 3.75; stroke, 3.75. There is no record of the crankshaft speed.

3—The high speed ratio in stock equipment is 4 to 1.

4—No.

5—Yes, if handled with due regard to the capabilities of that particular car.

WEIGHTS OF VARIOUS CAR PARTS

Factory Figures Given on Mercer, Franklin and Grant Six

Syracuse, N. Y.—Editor MOTOR AGE—Give the weight of the Mercer 1916 runabout.

2—Give the weight of the front and rear axles without wheels used in the Franklin Light Six, Grant Six Model K roadster, and Mercer runabout.

3—What ratio of unsprung weight will give the easiest riding cars, or what would be the correct weight of front and rear axles with wheels for a car weighing 2,000 lbs.?

4—Give the weight of the motor and transmission used in the Grant Six.—H. E. Mooney.

1—The weight without load is said by the factory to be 3430 lb.

2—The Franklin rear axle without wheels weighs 186 lb. and the front axle without wheels weighs 82 lb. This includes one-half of the front spring. The weight of the Grant rear axle less wheels is 211 lb. and the front axle without wheels 45 lb. That information on the Mercer is not available at this time. These are figures given by the factories.

3—The smaller the unsprung weight the easier the riding, theoretically.

4—The weight of the motor is 400 lb., the gearset 94 lb.

Ford Magneto No Generator

Washington, Ill.—Editor MOTOR AGE—At 20 miles per hour, will the ¾-in. Ford magneto deliver a 1,285 charge to the battery which is furnished on the Warner charging outfit?

2—Will 2 hours' running at an average of 18 miles per hour furnish 1 hour of light, and keep the battery fully charged? If not, how much running at above speed would be necessary?

3—Is there danger of overloading the magneto and consequent injury to it by keeping the battery fully charged?—G. E. Gilbert.

The magneto of the Ford car is not designed as a charging outfit and should not be used for this purpose. The attempt is strongly condemned by the makers. There is no regulation provided which would insure protection either to the battery or magneto.

NEW ZEALAND READER ANSWERED

Diagram Given to Show Installation of Ammeter on Saxon

Hawera, Tarcinati, New Zealand—Editor MOTOR AGE—Can dash board ammeters be fitted to 1917 Saxon roadsters? If so, give wiring diagrams. The 1917 model has a Haynes two-unit system.

2—Are the new model Saxon roadsters, illustrated in MOTOR AGE October 28, 1916, equipped with spare rim, one man hood, ammeter, or dash lamp?

3—Give gear ratios for above Saxon roadsters, old and new models.

4—What is oversize tire for 30 by 3 rim?

5—I have been an interested reader of your journal for some 12 months, and must compliment you on your paper, and the most interesting information combined therein. The articles on Electrical Equipment are especially good, and useful, especially in New Zealand, where there are no service stations, and expert electricians are few and far between.

6—Can any mechanical tire pump be fitted to 1916 and 1917 Saxon roadsters?—V. A. Stapleton.

1—There is no reason why an ammeter cannot be attached to the dash board of Saxon 1916 or 1917 four-cylinder roadster models. The diagram shown in Fig. 5 should show you clearly how the wiring should be done.

2—The new models have a spare rim, one-man top, but no ammeter or dash lamp.

3—The gear ratios are: Low, 15.46 to 1; intermediate, 8.66 to 1; high, 4.75 to 1.

4—Either 30 by 3½ or 31 by 3½.

5—May our good work continue to please you.

6—Practically any make can be made to fit.

CANNOT FIND JACK-SHAFT PLAY

May Be in Gearset Bearings, Bevel Gear Bearings or Universals

Excello, O.—Editor MOTOR AGE—When running on high gear at a rate of 5 to 8 m.p.h. the jackshaft on my model 17 Scripps-Booth roadster has a tendency to vibrate back and forward, making a jerk in the running of the machine. It seems to me that there is too much play either in the transmission or differential gears. Which is the right place to correct this trouble?

2—When the machine is running about 20 m.p.h. before it has attained its highest temperature the engine seems to load up and misfire on one cylinder, but when it is making a pull where it requires the full amount of power according to the amount of gas given it, it fires on all cylinders. Is the trouble in the gas equipment or not enough compression? The motor runs all right when it is warmed up.

3—Where is the Sterling motor made, and by whom?—P. J. McLaughlin.

1—If the looseness is in the gearbox you can determine this by attempting to push the drive member directly behind the gearbox back and forth. If it is in the bevel gears you can determine this by attempting to push the other end of the drive line back and forth. However, if there was looseness in the bevel gears there would

be undeniable evidence in the noise they would create. Possibly the universal is out of true or the slip end of the universal has been worn out of round.

2—The trouble is probably nowhere else but in the gasoline itself. The present low grade of fuel requires a very warm engine and manifold for perfect combustion.

3—Sterling Motor Co., Detroit, Mich.

Delco Used On Cole

St. Louis, Mo.—Editor MOTOR AGE—Kindly publish a description and diagram of the Delco system used on the 1913 Cole 4-40.—C. E. Shampaign.

The diagram is published in Fig. 4. This is a two wire system with an emergency equipment of dry cells used in conjunction with the storage battery. By two-wire system it is meant that the current is returned through a wire from each source of current use, instead of through the frame as is the case with a one-wire system. Ignition is performed through a distributer. The headlights are 7 volts and the lights are 21 cp. The side lights use 4 cp. bulbs and the dash and tail lights 2 cp. bulbs.

The component parts are: Storage battery, dry cells, ignition switch, ignition relay, light switch, distributer, and single unit dynamo and starting motor.

California Readers, Attention!

Bellefontaine, O.—Editor MOTOR AGE—Kindly illustrate plans for a miniature racing car. I want to use an Indian twin motorcycle engine with a jackshaft.—Wilmer Smith.

We appeal to MOTOR AGE readers in California or elsewhere for a description of one of the miniature racing cars which are so popular on the coast. There are a number of inquiries similar to the one above awaiting descriptive matter on these small-sized speedsters. Send us photographs, sketches and descriptive matter and the inquirers can know how you made your machine.

IOWA TITLE CLAIMANT'S FORD CAR

Winner of State Championship Event has 76-in. Wheelbase Job

Des Moines, Ia.—Editor MOTOR AGE—This is a picture of myself and my 76-in. Ford. See Fig. 5.

I claim title to the state championship by winning the Ford championship race at the state fair Sept. 1, 1916. The distance was 10 miles and my time was 12 min., 43 sec.

My equipment includes Master carbureter, Bosch magneto, aluminum pistons and a home-made camshaft. I have had the most success on 28 by 3 Michelin racing-tread tires. The small tank shown on the side of the car is a reserve oil container supplying oil through the tension spring acting hand pump to the crankcase.

Inquiries Received and Communications Answered

J. W. Martin.....Oakland, Cal.
Marion Scott.....Muskogee, Okla.
H. E. Mooney.....Syracuse, N. Y.
G. E. Gilbert.....Washington, Ill.
V. A. Stapleton..Haioera, New Zealand
P. J. McLaughlin.....Excello, Ohio
C. E. Shampaign.....St. Louis, Mo.
Wilmer Smith.....Bellefontaine, Ohio
J. A. Thompson.....El Paso, Tex.
F. E. Kirby.....East Moline, Ill.
Otto E. Gunstrom..Crystal Falls, Mich.
David Halferty.....Ollie, Iowa
M. W. Shay.....Des Moines, Iowa
Wendelin Rose.....Forestville, Wis.
J. M. Lowry.....Beaumont, Tex.
Stephen E. Smith.....Grantville, Kan.
A. L. Bennett.....Charlotte, Mich.
W. E. McKee.....Montezuma, Iowa
F. N. Clinton ..Jefferson Barracks, Mo.
M. P. S.....Yale, Okla.
S. C. Himelbach.....Hyde Park, Cal.

No communications not signed by the writer's name and address will be answered in this department.

I would not be able to give you a sensible estimate on the cost of the structure inasmuch as the only material expense was for mechanical perfection strung out over a period of several months. The body is merely a piece of "tin" and a few hours' work. I hope this will induce other Ford bugs to loosen up.—J. A. Thompson.

FLASH BOILER WATER FORCED

Same Principle Early Used by Frenchman Named Serpollet

East Moline, Ill.—Editor MOTOR AGE—Advise whether or not there is made, or has been made, by any manufacturer, for use on a steam motor car or steam truck, a flash boiler of the type wherein the water is forced into the boiler at a pressure slightly greater than that of the boiler, and in turn is generated into steam by coming into contact with a heated plate in the bottom of the boiler. It is understood that the boiler itself carries no head of water.—Frank E. Kirby.

We do not know of a steam motor car boiler having been made exactly as you describe, but the flash principle has been widely used. In the early days Serpollet, a Frenchman, developed a flash boiler with U-shaped tubes and very little water. Fuel and water were fed simultaneously according to the needs and it took much skill to handle the car in hilly going since there was no steam reserve to draw on. The well-known White flash boiler, which was built up to 1911, was an improvement as it had some little reserve capacity. The Lane boiler was a combination of fire-tube and flash system. A small amount of water was carried in the lower fire-tube section of the boiler.

Valve Timing of Chalmers

El Paso, Tex.—Editor MOTOR AGE—Give me the valve timing of the 1911 Chalmers 30 Continental engine. Also magneto setting.—Reader.

The inlet valves open 6 deg. past center. The magneto setting is thoroughly conventional. Set the No. 1 cylinder at top dead center and adjust the commutator so that the points for No. 1 cylinder are just ready to break. This must be done with the spark fully retarded.

Salt Water in Radiator

Crystal Falls, Mich.—Editor MOTOR AGE—Some time last winter I read in MOTOR AGE an account of the effect a salt-water solution would have on different parts of the motor, but now cannot recall what it was. Kindly advise whether or not it is injurious, and how.—Otto E. Gunstrom.

You undoubtedly refer to a salt water solution when used as a radiator anti-freeze. You may or may not know that the hardware, propellers, etc., on ocean-going yachts are made of bronze or brass because of the fact that iron, no matter how dressed with paint, will quickly rust due to the action of the salt water. The same trouble will occur if it is used in a motor car engine.

SIXTEEN-VALVE STUTZ PRINCIPLE

There Is No Valve-in-Head Overhead Camshaft Construction

Ollie, Ia.—Editor MOTOR AGE—Is the new sixteen-valve Stutz engine a valve-in-the-head with overhead camshaft?

2—What is the speed of the Stutz speedster with this type of engine?

3—What is the speed of the model 85 Overland four?

4—Is there a school where acetylene welding

is taught? And what would be the cost of a course?—David Halferty.

1—It is not. The valves are located in the side.

2—There is no official record of the speed, although the writer can testify that it is well above 65 m.p.h.

3—There is no official record of the speed of this car.

4—To our knowledge there is no school where this is taught. There is, however, a good instruction book covering this subject. It is entitled "Oxy-Acetylene Welding and Cutting." The author is Harold B. Manly and the publisher Frederick J. Drake & Co., Chicago.

Delco Repairman's Book

Des Moines, Ia.—Editor MOTOR AGE—I understand the Delco people publish a booklet for the benefit of the repairman, giving advice on locating trouble, making adjustments, etc. Are there any other electrical equipment or carbureter houses doing the same? If so, kindly publish their names and addresses.—M. W. Shay.

To our knowledge there is no manufacturer putting out a book on just the same lines as this Delco publication you refer to, but all the makers have very comprehensive instruction books covering their various products.

OIL THICKENS AFTER 500 MILES

This Is No Sign of Engine Trouble—Oil Should Be Removed

Forestville, Wis.—Editor MOTOR AGE—We have been having trouble with the oil in our 1914 Case 25 becoming thick after 500 or 600 miles of running, and it would be necessary to remove the thick oil and put a new supply into the crankcase. It is not in the oils, as we have tried various grades and kinds with the same result. The power is good, the compression fair. What causes this thickening of the oil?

2—What is the r.p.m. of this model?

3—What is the r.p.m. of the Paige 6-46 Fairfield, also the speed?

4—Several car owners have been using kerosene in the radiators as an anti-freeze solution. Is kerosene all right, or is it dangerous, and would it harm the engine and radiator in any way?—Wendelin Rose.

1—In the first place the oil should be flushed out every 500 or 600 miles of running. This motor is very economical in oil consumption and retains what is put in it for considerable time. The result is that the old and much used oil thickens as any oil will when long subjected to heat and carbon. If you want your engine to live a long life clean the oil out of the crankcase every 500 miles.

2—There is no recognized record of maximum engine speed, if that is what you refer to.

3—Regarding the engine, the answer to question No. 2 applies. There is no official record of the speed of this car.

4—Kerosene is not advised by MOTOR AGE. It is harmful to the rubber hose.

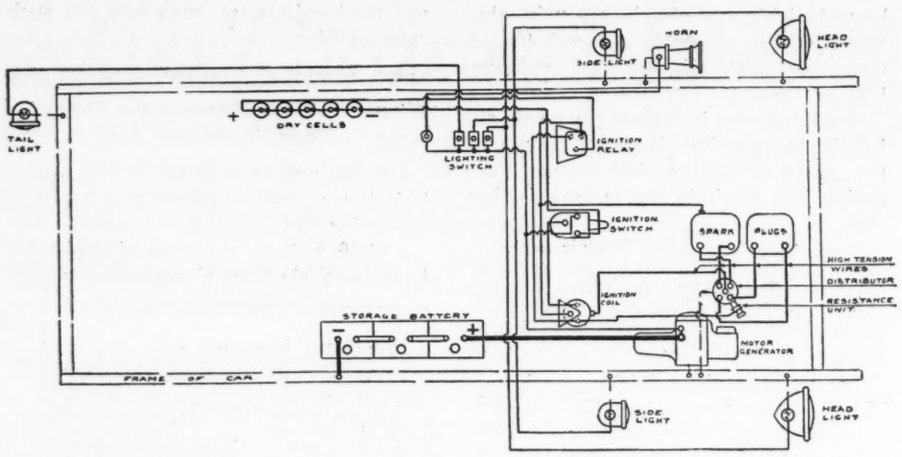


Fig. 3—The Delco system used on the Buick 1914 model B-24 was wired as shown in this diagram

Motor Car Engine for Hoist

Beaumont, Tex.—Editor MOTOR AGE—I have an old 1910 Mitchell car, the chassis and engine of which are in good shape. I wish to make a hoisting engine of it. Is this engine adapted to such work, and will MOTOR AGE give me suggestions as to the best method of doing the work?—J. M. Lowry.

The engine should be very well adapted for hoisting work. You do not tell us what kind of work you have in mind, however. If you will give us an idea of this possibly we can devise a sketch of a simple way of stringing up this motor to perform such work.

Ford Power at 2000 R.P.M.

Grantville, Kan.—Editor MOTOR AGE—They sell the Ford as a 20-hp. car. I figure that at 2,000 r.p.m. its engine will give 28 hp. Am I right?—Stephen E. Smith.

The S.A.E. rating of the Ford motor is 22.5. This is based on the supposition that a motor will develop its rated horsepower at 1000 ft. piston speed per minute. At 1000 r.p.m. the piston speed of a motor with 4 in. stroke, which is Ford size, is approximately 1333 ft. per minute. Using the S.A.E. formula of horsepower calculation the horsepower at this speed would approximate 30.5.

READER'S CURE FOR OIL PUMPING

Explains Methods He Uses to Seat Pistons and Rings Properly

Charlotte, Mich.—Editor MOTOR AGE—I have noticed many people ask regarding oil pumping, that is, where the oil gets past the pistons, and they have put in non-leaking rings which did not cure the oil pumping, so I wish to tell how I have cured a number of them.

First, if you want to go to the expense of lapping in .003 or .005 oversize pistons my advice is, do not do this yourself as the ordinary motorist knows nothing of this and would ruin the motor. Have a good mechanic do it. But the most important part I have seldom seen done, and a little thought would make it plain to anyone. That is, lap the rings to the piston and lap every ring to a good smooth seat on its individual groove. Do not get them mixed when assembling.

Oil does not work around the rings to my way of thinking, it works between the ring and the piston in and out, and a roughly machined ring and piston will let lots of oil get by. It is the same as the valves. A poor valve seat and you have no pep in the motor at all. Have them ground in and it improves the action of the motor. It is the same with the lapping of rings, it makes a tight seat and the oil cannot get by.

Also, have a machinist cut a champher below the lowest ring groove of about one-third the depth of the groove and drill six or eight $\frac{5}{64}$ holes through the same champher so that the bottom ring will act as a scraper. Now this champher above will not stop the oil. I have tried it.

Again, I have lapped and champhered

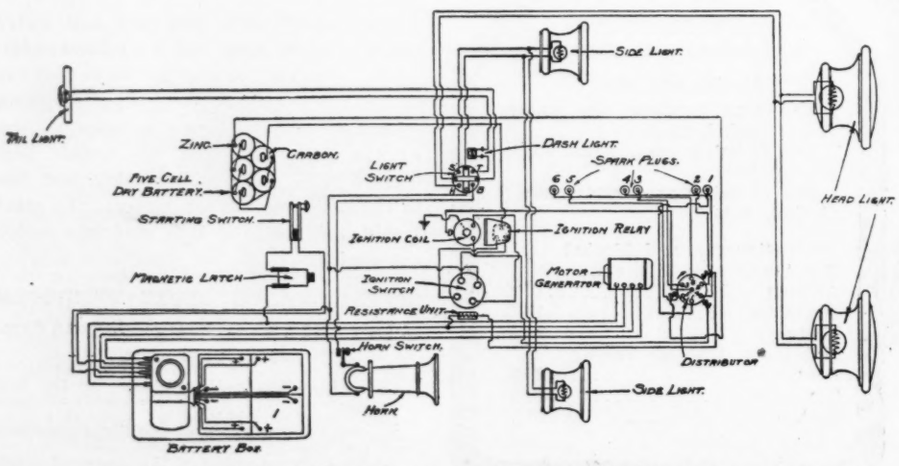


Fig. 4—The Cole 1913 model 4-40 was equipped with a two-unit, double wire Delco outfit wired as shown above

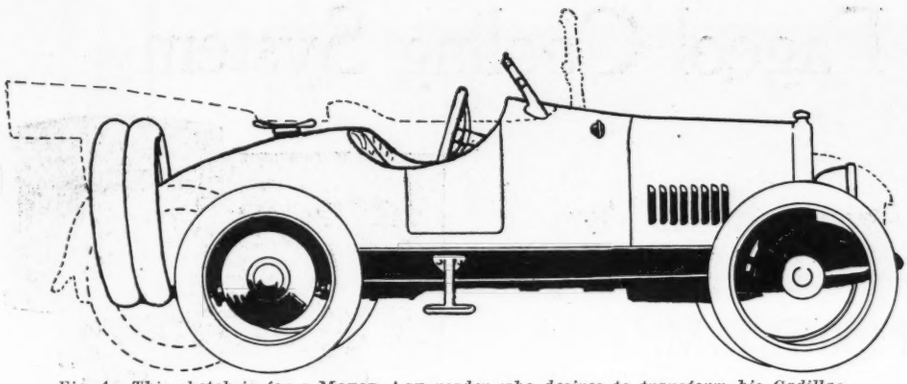


Fig. 4—This sketch is for a MOTOR AGE *reader who desires to transform his Cadillac eight into a speedster; expense no object*

rings and pistons on cars 5-years old and they would get more mileage on both oil and gasoline than they ever had before.

I have noticed many writers say, under no circumstances, use the piston you intend to use in the car for finish lapping. I do this and do it right along and I never have had scored a cylinder. Furthermore, I have purchased dozens of pistons and never have found one that would show lapping marks all the way around, true and even, to a cylinder that had not been lapped with its individual piston. Use a fine carborundum grade A or B and clean everything very thoroughly afterwards and nothing will happen, even if writers say so.

Lastly, lap the piston to its cylinder until a .002 feeler or thickness gauge will bind the piston, then when the full mirror-like polish has been obtained by running the engine you will find the pistons clear .003 to .0025, which is satisfactory.

Mechanics may say you have .003 oversize pistons and .003 oversize rings, and if the rings are lapped to the grooves they will slap, but they will not. I have engines running that do not make a sound which have .010 to .015 play in them. Also a ring should fit the cylinder with a .006 clearance between the two ends.—A. L. Bennett.

Carbon in Iron

Montezuma, Ia.—Editor MOTOR AGE—In casting cast-iron crankcases is it possible to cast a certain amount of carbon with the iron so that the casting will make a good wearing surface for a bearing? Cast iron against the steel of camshaft or crankshaft.—W. E. McKee.

It is possible to cast carbon into iron. In fact, there is no iron that does not contain a considerable amount of carbon. However, if you have in mind attempting to mix carbon into iron yourself in a casting job it is advised that this proposition of mixing alloys is in the art of metallurgy and is a thing which requires great study for good results.

Hydrometer for Alcohol

Jefferson Barracks, Mo.—Editor MOTOR AGE—Is kerosene a safe antifreeze liquid for the radiator and is it satisfactory?

2—In using an alcohol and water mixture, is there any way of telling—except when first mixed—the percentage of alcohol remaining in the solution?

3—What car or cars have the least number of grease cups, or on what car or cars is the lubrication mostly automatic?—Frank N. Clinton.

1—Kerosene is not a safe anti-freezing mixture for use in the radiator. Although there is little danger of fire from its use, it is not a good substance to have about rubber hose. The fire danger is that it may eat through the hose until it leaks out and

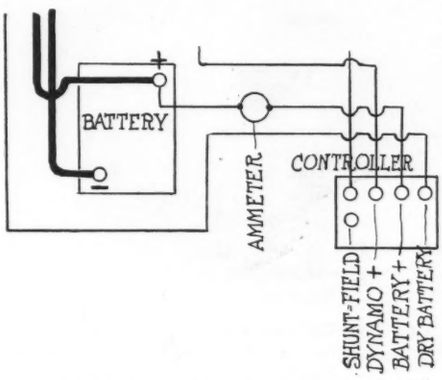


Fig. 5—Ammeter connection on a Saxon four-cylinder roadster

then becomes ignited by contact with some part of the electrical equipment.

2—By the use of a hydrometer. You can fill the radiator with what you consider the correct proportion of alcohol and water for the temperature conditions of your locality and then test this solution with a hydrometer to determine its specific gravity. Once you have found the figure for the correct mixture, you can tell thereafter whether the percentage has dropped by new tests with the hydrometer.

3—There are a goodly number of new cars in which few grease cups are in evidence. Striking examples of the wholesale removal of the grease cups are found in the Kisselkar hundred-point six and the Marmon 34.

A CADILLAC REBUILT FOR SPEED

Reader Wants Idea for Racer to Be Rebuilt; Expense No Object

Yale, Okla.—Editor MOTOR AGE—Kindly publish a rough sketch of a Cadillac eight touring car cut down for a speedster. Expense is no consideration whatever.

There will be no fenders and the wheelbase will be shortened 18 in.—M. P. S.

The MOTOR AGE artist's idea of how your car could be made most attractive is shown in Fig. 4. If the wheelbase is shortened 18 in., as you suggest, a compact and very racy looking car can be constructed by using a racing tail such as shown. This tail carries the gasoline and oil supply and you will note that the top of the seats are flush with and built into this tail. The cowl should be carried back to cover the legs of the passengers and a slanting windshield should be installed as shown to make a classy job. The same hood and radiator and other general characteristics can be well maintained.

Old Cadillac for Long Trip

Hyde Park, Cal.—Editor MOTOR AGE—Could a Cadillac 30 be made into a fore-door, or would it be advisable to secure a fore-door body?

2—Is such a car sturdy enough for a cross-country trip from Los Angeles to Detroit, Mich.?—S. C. Himelboch.

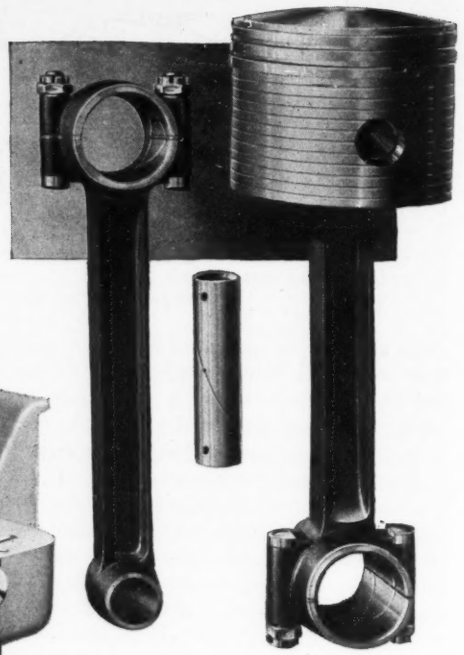
1—The car could be converted very easily into a fore-door, but of course it would not be as attractive a job as it would be if a new and modern body were put on.

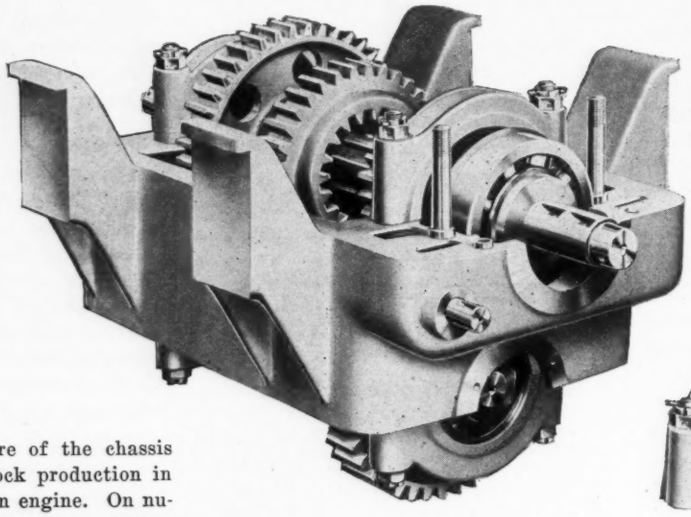
2—Depending entirely upon what care it has had throughout its running. If it is mechanically tight, if the pistons are not sloppy in the cylinders, if the bearings are good all around, it should make the trip from Los Angeles to Detroit without undue trouble.

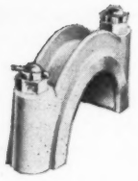
Fig. 6—This Ford and its driver have won many races and incidentally a state championship cup

Oil Aids Fageol Cooling System

Lubricant Circulates Around Intake Manifold—Engine Is Guaranteed to Develop 125 H.P. at 1300 R.P.M.







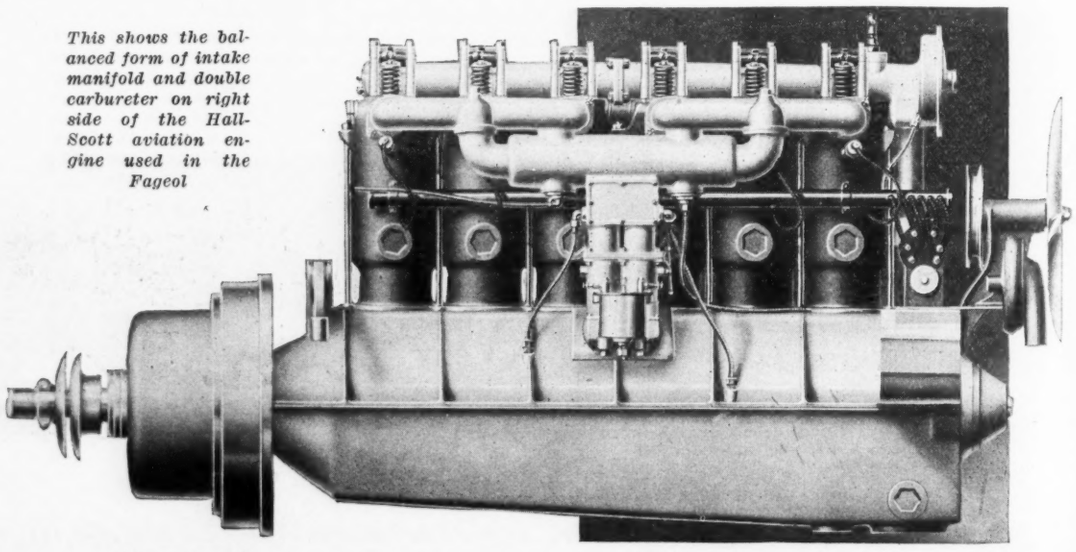
Above is shown the piston and connecting rod assembly in the new Fageol and at the left is the gearset which is entirely a Fageol design

DETAILS of the new Fageol passenger chassis, briefly described in a recent issue of MOTOR AGE, are now at hand and outline a design which is unique in many respects. The Fageol chassis is the product of the Fageol Motors Co., Oakland, Cal., and sells as a chassis at $9,500. Any body work is additional and optional with the purchaser of the chassis.

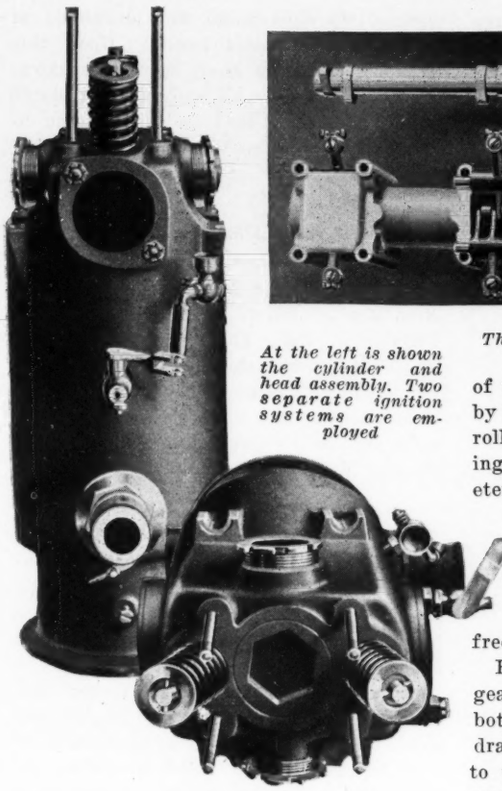
The outstanding feature of the chassis is the employment as stock production in a motor car of an aviation engine. On numerous occasions it has been demonstrated that the employment of a high-speed, light aeronautical engine in a motor car chassis makes an ideal combination where performance is the chief consideration and earlier employment of an aviation motor on road and track vehicles has been merely of an experimental nature, either for racing purposes or preliminary development work on the engine. In the Fageol the Hall-Scott aviation engine is stock. This is a six-cylinder, 5 by 7, and in a recent test was run continuously for 64 hrs. at 1300 r.p.m., developing 130 b.h.p. At the end of this run the engine was torn down and no defects appeared. The engine weighs 560 lbs. and is guaranteed to develop 125 h.p. at 1300 r.p.m. This is 4½ lb. per h.p., and 6.6 cu. in. piston displacement per horsepower.

Aviation motors have become very generally the overhead-valve type and the Hall-Scott likewise has valves in the head, with an overhead camshaft. Although the cylinders are separately cast they are machined on the sides so that when assembled they form a solid block and give the appearance of a block casting. Swedish grey iron is the material of the casting. A Swedish metal, known as semi-steel, also is used for the pistons. These are exceptionally light, but strength and rigidity have been obtained by a series of six deep ribs under an arched head which also serve to carry the heat away from the piston head.

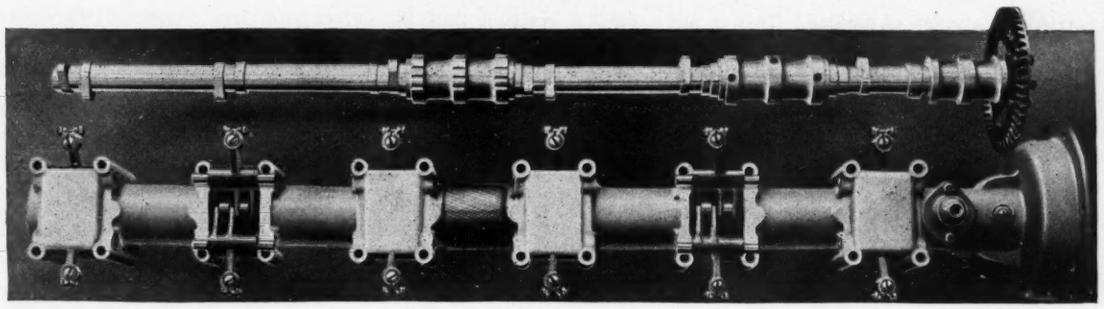
One of the unusual features of the motor is the fact that both oil and water are used in cooling. The oil is circulated around the long intake manifold which not only keeps this manifold warm, but assists in cooling the oil and thus keeps down the crankcase heat. The cylinders are kept at a uniform temperature by internal outlet pipes which run through the head of the six cylinders. In these pipes slots are cut so that the cold water is drawn directly



This shows the balanced form of intake manifold and double carbureter on right side of the Hall-Scott aviation engine used in the Fageol



At the left is shown the cylinder and head assembly. Two separate ignition systems are employed



The camshaft is inclosed in an aluminum housing bolted directly to the tops of the cylinders

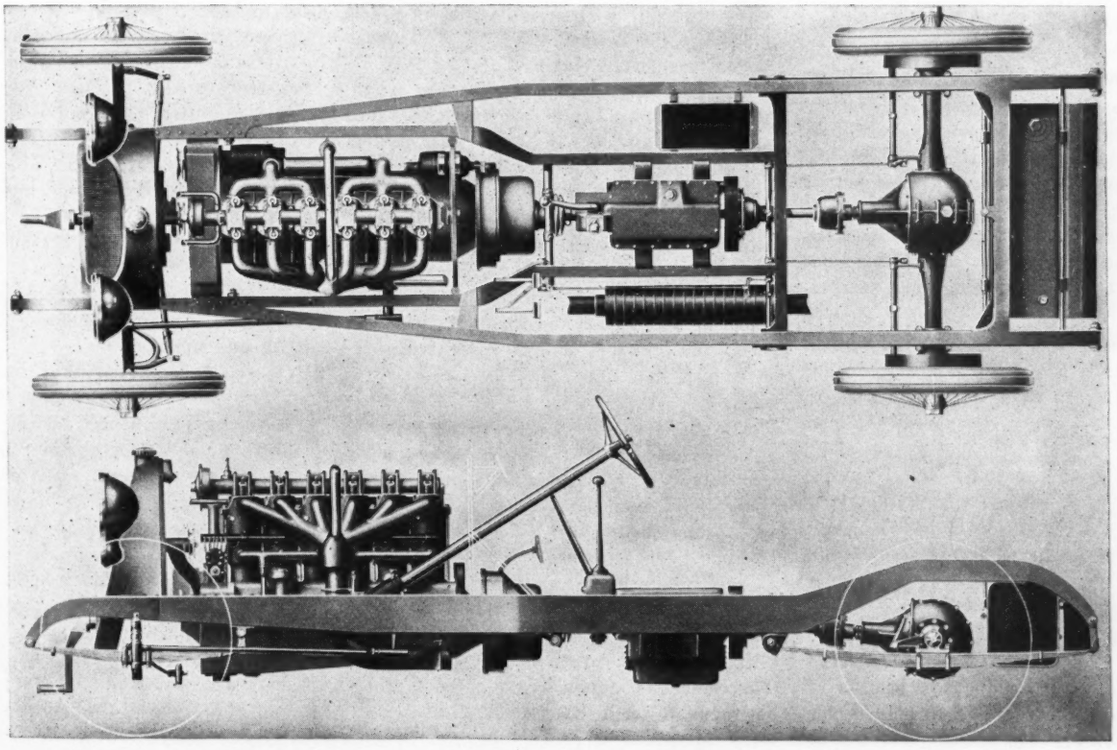
around the exhaust valve where the heat is greatest. There is 2 in. of water space above the cylinder head. Circulation is by centrifugal pump.

From the crankshaft the valve drive is carried to the overhead camshaft by means of a vertical shaft in connection with bevel gears. The camshaft is inclosed in an aluminum housing, bolted directly to the tops of the cylinders. The valves are operated by shorter rocker arms with hardened steel roller followers on the cam end and adjusting screws on the opposite end. The diameter of the valves is 2½ in. or one-half the cylinder diameter. The valves are tungsten steel and are seated directly in the cylinder heads. The valve ports have been kept large in proportion with the valves, giving free inlets and outlets for the gases.

High pressure oiling is used with a large gear pump located in the oil sump in the bottom of the crankcase. The oil is first drawn from the strainer in the oil sump to the long oil jacket around the intake manifold and then forced to the bearings by pressure which varies according to the motor speed from 5 to 30 lb. The camshaft drive mechanism is oiled by forcing the oil into the front end of the shaft allowing the shaft itself to act as a distributer, and the surplus flows back to the crankshaft through a hollow vertical tube located at the rear of the crankcase housing. This supply also oils the magneto and pump gears. Aluminum alloy is used in the construction of the crankcase, the lower half of which can be removed without breaking any of the oil line connections.

For ignition two six-cylinder magnetos are used mounted on the opposite ends of a cross shaft at the forward end of the engine. This gives two independent ignition systems with independent spark plugs and so arranged that one system can be completely out of commission without interfering with the functions of the other. A double Zenith carbureter with a single float, is used with a unique feature in that the jacketing around the carbureter manifold is filled with the warm crankcase oil thus serving to aid in the vaporization of the fuel as well as to reduce the heat of the crankcase. The arrangement of the intake manifolding should be noted. This is shown in the view illustrating the right side of the engine and it indicates the jacketing connections with the double carbureter and the balanced form of intake manifold.

A feature of the radiator is that it is



Above is the general chassis layout. It will be seen that the final drive shaft is very short, the engine and gearbox taking up a good part of the entire length of the frame. Below is shown the springing and general view from the side. Note the peculiar radiator design

carried on a slant of 15 deg. This is not only for appearance, but greater cooling efficiency is claimed because the air is forced through the radiator with greater friction than is possible with the vertical type.

The engine is mounted on a sub-frame which is extended back to carry the gearset and clutch. Behind the gearset the drive shaft is exceedingly short. The greater part of the distance between the rear axle and the engine is taken up by the clutch housing and by the transmission members. The clutch is a Hele-Shaw of standard form with regulation V-grooved twin-plates of phosphor-bronze operating against steel plates in a bath of oil. This is housed in an oil-tight housing back of the flywheel and connects with the main shaft of the gearbox through a universal coupling.

Gearbox a Fageol Design

The gearbox is entirely a Fageol design mounted in a bronze and aluminum case. The box provides three speeds forward and reverse and the ratios are such as to provide 5 to 1 on first, 2½ to 1 on second, and 1¼ to 1 on third. The novel feature of the case is that the main box and the supporting arms are of manganese bronze and so arranged that the main shaft and countershaft mounted one above the other are just half within the case as shown.

The upper section of the case is cast integrally with the brackets and forms a housing for the shifter lever, shifting mechanism and emergency brake lever. The object of this form of case is to permit a thorough inspection of the gears and bearings simply by removing either the upper or lower section of the case. A semi-floating rear axle is used with the shafts carried on Bock taper roller bearings and with chrome nickel steel used for the driving members.

The brake layout has been given particular attention with the foot brakes mounted on 16-in. ribbed drums bolted on the rear wheels and the hand brake operating against the 12-in. ribbed drum on the main transmission shaft just back of the gearbox. The springs are semi-elliptic.

Alloy pressed steel is used for the chassis frame. This is a special design in which the side rails are 2 in. wide and 6½ in. deep, with the forward end narrowed down to 29 in. to permit of easy turning. The main sills of the frame are directly under the main sills of the body, with the front and rear springs directly under the main frame member. The wheelbase is 135 to 145 in., according to the body model desired.

The steering gear is especially built for the car and is bolted directly to the subframe. A secondary support is secured in the aluminum dash which provides for adjustable rake of the steering column to fifty individual requirements.

The control levers are designed to be in such a position that the driver will drop his hand naturally from the steering wheel to the emergency brake or the gear control lever. Ivory mounting is used for the levers in the quadrant which is at the center of the wheel.

Starting and lighting is by a 12-volt system with the head lamps mounted on the radiator. The engine is illuminated by two special lights when the bonnet is raised.

Copper is used for the 25-gal. gasoline tank, the material being formed from 12 gage sheeting and the tank fitted with a magnetic gage indicating the extent of the gasoline supply. The wheels are wire with plain clincher rims and fitted with 34 by 4½ cord tires. Two complete spare tires and wheels are provided.

Several features about the bonnet are exclusive, particularly the ventilation which is protected by patent applications. There are six triangular curved ventilators which are designed to clean out the air beneath the hood. These projecting ventilators start with a line flush with the top of the hood, tilt upwards and backwards for a length of 6 in. The rear opening may be closed at will with a waterproof door controlled by a hand lever on the dash, making the hood entirely water-proof.

Individual Features

Another individual feature on the bonnet is the use of vault lock latches. The handles of these are ivory and the latches are always under spring tension to prevent rattle. The instrument board is also patented and is in the form of a single panel through which the recording hands of the different instruments extend and over which a single piece of plate glass is fitted. The windshield, also, is a special design and is claimed to be entirely rain-proof. The glasses lap over each other by 3 in. when they are entirely closed.

At the back of the body there is a substantial luggage carrier made of bronze and brass, hand finished and nickel plated. All the tools are made of high-grade steel and nickel plated socket wrenches are provided to fit every bolt in the entire engine and chassis. The tools are mounted in flush line receptacles and when the tool box lid is opened a table is formed with all the tools in their places and ready for use. The box is designed so that it is lighted automatically.

DEALERS WIN LICENSE POINT

Los Angeles, Cal., Jan. 26—The motor car dealers of California have won out in their contention that the state motor vehicle department had no right to refuse to issue licenses to dealers who had failed to supply the department with reports of sales made during 1916. Superintendent French met in consultation with representatives of the dealers and declared his department is empowered legally to compel them to do the vast amount of clerical work involved in preparing reports, but he only seeks to prevent abuse of the dealer privilege and if the suits entered against the department were dismissed he would have licenses issued. Upon this promise, the suits have been withdrawn, dealers are to have as many number plates for cars as they need and they agree to recognize the state's authority relative to reports.

VAN SPEEDMETER STOCK

Van speedmeters have been made stock equipment on the Wolverine of Toledo, New Era of Joliet, Ill., and the Pennsy, Pittsburgh, Pa. The Drummond, HAL-Twelve, Jeffery, and Princess use Van Sicklen speedmeters as stock equipment in adition to the cars shown with this equipment in the specification tables of the issue of MOTOR AGE of Jan. 4.

CALIFORNIA LEGISLATION BROAD

Los Angeles, Cal., Jan. 26—Recommendations for legislative amendments to the laws of California have been made to the legislature now in session, which, it is hoped by the proponents, will make the thriving business of stealing motor cars less attractive in this state. The recommendations were adopted as the result of a conference between chiefs of police, attorneys and representatives of motoring organizations.

The following are included in the suggestions for amendments:

Application for registration under oath with severe penalty for perjury.

Registration and identification card, with signature of car owner, to be carried in transparent case on instrument board.

Each transfer of car to appear in indorsement on back of certificate of ownership.

Each driver to have operator's license costing 50 cents in addition to regular registration fee.

Two hundred thousand dollars or more to be collected from operators' fees to be applied for establishment of state patrol system of highways, inspectors being given police powers, including the making of arrests in speed and road rule violations.

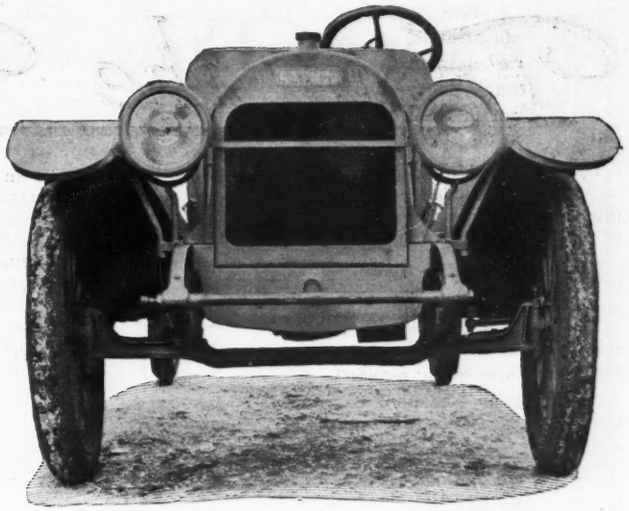
Each trailer, whether commercial or passenger, to require license. Fee to be $1 or $2 additional.

It also is proposed that some plan be put into effect whereby fines imposed by local courts for violations of the motor vehicle act may be used for road construction purposes in the counties where the offense is committed. At present, neither the counties nor the highway commission builds any roads in municipalities. In many places throughout the state an improved road leads up to a town's municipal limits and resumes again on the opposite side, but the intervening distance is in poor condition It is proposed to amend the laws so that the counties, under reasonable circumstances, may build or assist in building sections of roads within municipalities.

Dependable Truck

Includes Complete Electric Equipment, Bailey Differential and Worm-Gear Drive

A Maxfer Product



The Maxfer Dependable coming on. Note the large headlights which are provided with dimmers

COMPLETE electrical equipment, worm-drive and a Bailey non-stall differential are found in the new Maxfer Truck & Tractor Co. one-ton truck which sells for $1,195. This Chicago product is powered with a four-cylinder motor with 3½-in. bore and 5-in. stroke, which is said to develop a full 30 h.p. at a reasonable operating speed. The carbureter is an automatic float feed type with a hot-air attachment of such design as to bring the motor heat quickly to an efficient operating temperature.

The starting and lighting system is of a two-unit type with all wiring carried in conduit. Having in mind making the truck adaptable for all kinds of service in city and country, the car is provided with power headlamps embodying dimmers, and of course there is an electric tail lamp. Ignition is also taken care of through the composite Delco equipment. It is a six-volt system using a Willard battery for storage.

The frame is of $\frac{3}{16}$-in. stock with a depth of 4½ in., and is heavily re-inforced by cross-members and gusset plates. Springs, front and rear are half-elliptic, of the no-center bolt type. The rear spring is 3 in. wide and 51 in. long. The front axle is a drop-forged I-beam with heavy steering knuckles and spindles. The rear axle is of the David Brown worm type with a Bailey non-stall differential, as previously stated. There are no truss rods, the torque being taken through the springs.

The emergency brake is internal operating with a 13½ in. diameter and a 2½-in. face. The external contracting service brake has a 14-in. diameter and a 2½-in. face. Brake equalizers are provided on the rear axle.

The front wheels are 34 by 4; pneumatics and solids are carried on the rear of the same size. The chassis has a 130-in. wheelbase with a 56-in. tread. The available loading space is from 4 to 6 ft. wide, and from 9 to 11 ft. long, depending on the body used. Equipment includes a cab, curtains, and windshield.

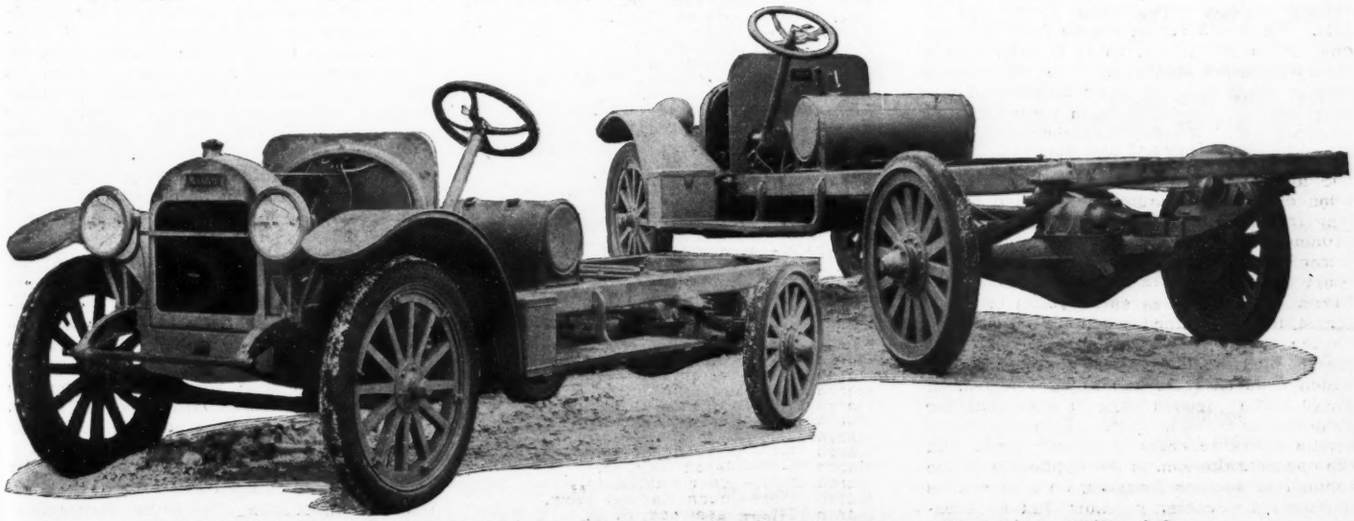
EMBARGO DECLARED

Detroit, Jan. 26—An embargo has been declared on all freight excepting coal, live stock and food products, through the Toledo gateway to Detroit, which it is expected will relieve the serious shortage of coal that is now threatening the Ford Motor Co., the Packard Motor Car Co., and the other car manufacturers in this city. At the same time that the embargo lifts the difficulties of coal shortage, it adds to the troubles of motor car makers insofar as it hinders all shipment of cars by way of Toledo.

At this time it is estimated that 14,000 motor vehicle freight cars are needed beyond the present supply to handle motor car shipments.

EXHIBIT NEW PLANE MOTOR

Detroit, Jan. 23—An eighteen-cylinder engine constructed by P. W. Murphy, manager of the camshaft department of the Studebaker Corp., and W. E. Looney, S. Smith and S. Pepilinski, also Studebaker employes, is on exhibition at the National Automobile School here. The motor is intended for aeroplane purposes and has cam-drive opposed cylinders and little head resistance. It has no crankshaft and the drive is on the drum cam. Present weight is 270 lb. but it is expected that this will be reduced to 200 lb. The motor yields 120 h.p.



Three-quarters views of the Maxfer 1-ton truck. Note the worm-drive axle with accessibly located oil-filling hole

From the Four Winds

TO Show at University—The Automobile Trade Association of Champaign County, Illinois, will hold a motor show in the armory of the University of Illinois March 1-3.

Show Profits for Roads—The Madison, Wis., Automobile Dealers' Association will give the net profits of its sixth annual show to the Madison Good Roads Association. The sixth annual show, by the way, is to be the association's first show under one roof.

Detroit Club Elects—William E. Metzger has been elected president of the Detroit Automobile Club. The other officers are: Vice-presidents, Martin L. Pulcher, Edward N. Hines and Sidney D. Waldon; secretary, W. B. Bachman; and treasurer, J. Lee Barrett.

Show Planned for Vancouver—The British Columbia Automobile Association will hold the national motor show of Western Canada in Vancouver, B. C., March 12-17. The exhibition will be in the Horse Show building, and a fashion show will be conducted at the same time.

Tire Estimate for 1917—It is estimated that more than $350,000,000 will be spent in the purchase of tires for pleasure cars alone during 1917. The estimate is based on the number of cars in use, the average mileage, the guarantees ordinarily made with tires and on other figures of tire consumption by car owners in the past.

Atwood Heads Dallas Association—John W. Atwood of the Buick Automobile Co. is the new president of the Dallas Automobile and Accessory Dealers' Association. The other officers are: Vice-presidents, W. G. Langley, Franklin, Dan F. Safford, Overland, and W. H. Noble, Texas Co.; secretary, R. C. Langley, Dallas Buick Co.; treasurer, R. L. Cameron.

Jackson County, Mich., Organizes—More than eighty members joined the new Jackson County Automobile Club, Jackson, Mich., last week. Winthrop Withington of the Sparks-Withington Co. was elected president; A. Callaghan, vice-president; A. J. Croman, second vice-president; I. Godfrey, third vice-president; C. F. Holland, treasurer; and L. T. Palmer, secretary.

Claims First Motor Car—Delaware claims the distinction of being first in the field with the motor car. Oliver Evans, a native of this state, is said to have constructed a forerunner of the present day motor car in 1844. He was a steam engine inventor, and one of his inventions, so it is said, was a steam-propelled carriage. The contrivance was in shape like a boat on wheels and was propelled by a walking-beam engine similar to those used on many steamboats.

Court Upholds Pedestrian—Pedestrians are no longer required to exercise the precaution of "stop, look and listen" when crossing streets so that motor accidents may be avoided, according to the decision of Judge Oscar M. Fritz of the Milwaukee circuit court handed down in a $5,000 damage suit. Frank Klokow was given a verdict of $7,850 for injuries sustained when he was struck by the car of C. B. Harbaugh. The jury's award was held excessive by the court, which reduced it to the amount asked, or $5,000. The decision says in part that the stop-look-and-listen rule, applicable to a person about to cross a railway track and the operator thereon, is not applicable to the conduct of persons traveling on a street, as it does not necessarily follow that a pedestrian is guilty of negligence because after having taken an observation, when about to enter a roadway, to ascertain if a motor car was coming, and failing to see any, he omitted to look again.

Banquet to Close Show—A banquet at the Hotel DuPont will close the motor show at Wilmington, Del., Saturday. It will be under the auspices of the local dealers.

Car May Curtail Railroad—Some idea of what the motor car has done for Connecticut is had from the announcement that the New York, New Haven & Hartford railroad wants to discontinue the part of its line which runs from Saybrook Point to Fenwick. The latter is a fashionable shore resort, and those who summer there use motor cars extensively. Last summer travel between the two points was very light, hence the resolution introduced by Senator Whitney in the legislature to authorize the road to discontinue its branch, which has been in operation since 1871.

Show Dates Postponed—Inability of the factories to ship new models in time for previous show dates led the Asheville, N. C., Automobile Trade Association to postpone its show from Jan. 25-27 to Feb. 22-24.

States for Free Bridges—Pennsylvania and New Jersey have adopted a policy of appropriating $100,000 each a year for five years to create a fund of $1,000,000 to make interstate toll bridges free. There are sixteen toll bridges across the Delaware river, which are largely used for touring traffic.

Has Son's License Revoked—She thinks her son, Edward H. Davis, Salem, N. J., has figured in too many accidents and believes him better off without power to drive a car so she presuaded Commissioner William L. Dill to revoke the young man's license. He was arraigned on a charge of driving while intoxicated.

May Add Motor Supplies—Wisconsin harness makers will add motor car accessories, supplies, tires and other goods of a similar nature to their stocks, if suggestions made at the annual convention of the Wisconsin Harness Makers' association in Milwaukee are adopted. Speakers urged the change to offset the loss of regular trade because of the encroachment of motor vehicles.

New Officers of Champaign Club—Howard A. Amerman, Marmon-Buick Sales Co., Urbana, Ill., has been elected president of the Automobile Trade Association of Champaign County, Illinois. The other officers are: Vice-presidents, C. B. Wiggins, Cadillac agency, Champaign, Harry Herrick, Herrick Auto Supply Co., Champaign, and E. W. Harriman, Harriman Auto Co., Urbana; secretary-treasurer, Leslie R. Lumley of Lumley Bros., Champaign.

Milwaukee Tries Spotlight—The Milwaukee police department is experimenting with the idea of putting traffic officers stationed on downtown intersections into the spotlight. By courtesy of the Electric Co powlight. By courtesy of the Electric Co. poweral corner buildings and are directed at the street on the spot where the traffic officer stands so that traffic cannot fail to see the officers or the directions he may be giving. So far the system is declared a success.

Extends Insurance Operation—The Builders' Mutual Limited Insurance Co. of Wisconsin, an adjunct of the Master Builders' Association of Wisconsin has extended its operations to include fire and theft, property damage and general liability coverage for motorists in addition to its present lines of workmen's compensation and other insurance. The mutual will write only members of the association, as before. Of the 413 members of the builders' association, 300 are policy-holders in the Mutual.

How South Africa Builds—South Africa builds roads to the best of its materials and funds ability. The municipality of Johannesburg has 775.4 miles of roads, with an average width of about 59 ft. Very little rock suitable for construction is native to the city, and the materials used soon goes to pieces on the busy thoroughfares. Construction is cheap, and more roads thus are possible. Labor is about 40 cents a day. The city has had a stone-breaker plant for seven years. Tar coating is used to keep down the dust. Good roads connect the city with surrounding suburbs.

Coming Motor Events

RACES
—1917—

May 19—Metropolitan Trophy, New York speedway.
†May 30—Indianapolis speedway.
†June 9—Chicago speedway.
June 23—Cincinnati speedway.
†July 4—Omaha speedway.
†July 14—Des Moines speedway.
†July 28—Tacoma speedway.
August 4—Kansas City speedway.
†September 3—Cincinnati speedway.
†September 15—Providence speedway.
†September 29—New York speedway.
October 6—Kansas City speedway.
October 13—Chicago speedway.
October 27—New York speedway.

†A. A. A. championship events for 1917.

MEETINGS

Feb. 13-14—National annual convention of Pike's Peak Ocean-to-Ocean Highway, St. Joseph, Mo.

SHOWS

Jan. 27-Feb. 5—York, Pa.
Jan. 28-Feb. 3—Wilmington, Del.
Jan. 29-Feb. 3—Buffalo.
Feb. 3-10—Minneapolis.
Feb. 5-10—Bangor, Me.
Feb. 5-10—Indianapolis.
Feb. 10-17—San Francisco.
Feb. 10-17—Hartford, Conn.
Feb. 12-17—Kansas City.
Feb. 12-17—Louisville, Ky.
Feb. 12-17—Nashville, Tenn.
Feb. 13-16—Grand Forks, N. D.
Feb. 13-16—Fargo, N. D.
Feb. 13-17—Williamsport, Pa.
Feb. 13-17—Sioux City, Ia.
Feb. 14-17—Peoria, Ill.
Feb. 19—Pittsfield, Mass.
Feb. 19-24—Bridgeport, Conn.
Feb. 19-24—Des Moines, Ia.
Feb. 19-24—Duluth, Minn.
Feb. 19-24—Grand Rapids, Mich.
Feb. 19-24—St. Louis.
Feb. 19-24—Syracuse.
Feb. 21-23—Dodge City, Kan.
Feb. 21-24—Flint, Mich.
Feb. 24-March 4—Atlanta, Ga.
Feb. 26-March 3—Omaha, Neb.
Feb. 26-March 3—Great Falls, Mont.
Feb. 26-March 3—Utica, N. Y.
March 1-3—Urbana, Ill.
March 3-10—Boston.
March 3-10—Washington, D. C.
March 5-10—Bridgeton, Conn.
March 6-10—Fort Dodge, Ia.
March 7-10—St. Joseph, Mo.
March 14-17—Davenport, Ia.
March 14-17—Mason City, Ia.
March 18-23—Cedar Rapids, Ia.
March 19-24—Cedar Rapids, Iowa.
March 27-31—Deadwood, S. D.
April 4-7—Stockton, Cal.

Among the Makers and Dealers

KAUFMAN TO JOBBING HOUSE—Carl Kaufman has become general manager of the Auto Hardware & Equipment Co., New York. The company is a large jobber.

Weber With Eugene Meyer & Co.—Orlando Weber, who recently resigned as director of the Maxwell Motor Co., Inc., has joined the banking firm of Eugene Meyer & Co., New York.

Large Stock on Hand—The Paige-Detroit Motor Car Co., Detroit, has $2,600,000 worth of stock on hand for the immediate manufacture of its cars and will increase this to $4,000,000 within the next 10 days.

Freeman Is Elected Treasurer—H. E. Freeman, formerly vice-president of the American Trust & Savings Bank, Springfield, Ohio, has been made treasurer of the Robbins & Myers Co., maker of electric motors, generators and fans.

Allen Motor Co. Expands—The Allen Motor Co., Fostoria, Ohio, has purchased 58 acres additional ground for the enlargement of its plants, and work on new buildings will begin in the spring. The Cleveland chamber of commerce made attempts to have the plant remove to that city.

Coffin to Speak—H. E. Coffin, vice-president of the Hudson Motor Car Co., will address the Chamber of Commerce of the United States at the fifth annual meeting of that body at Washington Jan. 31-Feb. 2. Mr. Coffin will speak in behalf of national defense.

Universal Car Equipment Stock Offered—The stock of the Universal Car Equipment Co., Detroit, is being offered to the public. The company is capitalized for $100,000, all common, and paid 400 per cent dividends in 1916. Orders received to date, according to the company officials, assure a dividend of 18 per cent.

To Make 2000 First Year—The Bethlehem Motor Corp., Allentown, Pa., which was organized recently, is planning the initial building of its proposed plant for the manufacture of commercial vehicles. The property is on the New Jersey Central railroad. The company expects to make 2000 trucks the first year.

McIntyre Mfg. Co. Buys Land—The McIntyre Mfg. Co., Columbus, Ohio, maker of the Farmer Boy tractor, has purchased a tract of 12 acres on which to erect a factory 100 by 200 ft. The present plant is too small to take care of the increased demand for tractors. The work of construction will be started as soon as the weather will permit.

Agent Drives Cars Home—Harry J. Adams of Fostoria, Ohio, district agent for the Reo, took seventy-five drivers to Lansing, Mich., and drove that many Reo cars to Fostoria in one day, a distance of 165 miles. Among the drivers was one woman, Mrs. E. W. Peters of Toledo. She came through with a perfect record. The chauffeurs were corralled in several northwestern Ohio towns.

Takes Exception to Advertisement—The Cutler-Hammer Mfg. Co., Milwaukee, manufacturer of the C-H magnetic gearshift, has taken public exception to an advertisement of 5-year convertible notes of the Premier Motor Co. of New York, which appeared in a Milwaukee newspaper on Jan. 12 and which used the name of the Milwaukee concern. Cutler-Hammer state that it has not guaranteed and does not guarantee these notes and that it "has sold and guaranteed to Premier Motor Co. certain magnetic gearshifts for attachment to its motor cars but has no other connection with the Premier Motor Co. or its notes."

TAKES A PRIZE IN PHILIPPINES—A great fete was held in Manilla recently in honor of the return from the United States of Manuel Quezon, resident commissioner. Among the features was a parade of motor cars, all gaily decorated. The Dodge Bros. car shown in the picture was awarded a first prize.

10,000 Units in 17 Months—The Olson Converting Units Co., Detroit, which manufactures units for conversion of pleasure cars into trucks, has sold 10,000 of its units in the first 17 months of business.

Hutton Director of Purchases—W. H. H. Hutton, Jr. has been made director of purchases for the Timken Axle Co., Detroit. The company recently held a stockholders' meeting and re-elected all other officers.

Fletcher to Represent Mitchell—H. M. Fletcher, formerly district manager for the Maxwell Motor Car Co., Detroit, has become the district representative in the Southwest for the Mitchell Motor Car Co. of Racine, Wis.

New Tire Co. Formed—John C. Ames, W. C. Campbell, F. C. McCarthy and Carlos Ames have organized the Ames Tire Co., Chicago, with Carlos Ames as president. Tires for both motor trucks and pleasure cars will be handled.

Army Expert at Nash Factory—P. G. Little, who acted as French inspector at the Jeffery factory while it was furnishing army trucks for use in war, has been appointed chief inspector of the Nash Motors Co., Kenosha, Wis. Mr. Little started his engineering work in England with the Crossley Motors, Ltd. In this country he has been with the Marathon Co., Nashville, Tenn., and the Haynes Co., Kokomo, Ind.

H. L. Connell Dies—Herbert L. Connell, instructor in motor car practice in the Milwaukee Continuation School system since 1914, died at his home in Milwaukee Jan. 19. Mr. Connell was graduated from the University of Michigan college of mechanical engineering in 1911. He was with several Detroit factories, including the Packard, for three years before coming to Milwaukee.

Findlay Tire Sale Feb. 13—The common pleas court has set Tuesday, Feb. 13, as the day upon which the Toledo-Findlay Tire Co.'s property at Findlay, Ohio, will be sold by the receiver, V. T. Spitler. The sale must be for not less than $30,000.

McGrew Leaves Napoleon—F. M. McGrew, one of the incorporators of the Napoleon Auto Mfg. Co., Napoleon, Ohio, who has been acting as general manager, has resigned. His successor has not been appointed yet.

Pennsylvania Rubber Expands—The Pennsylvania Rubber Co. has completed additions to its factories at Jeanette, Pa., to increase the output of the plant to 2500 tires a day.

Kelsey Elected President D. A. C.—John Kelsey, president and general manager of the Kelsey Wheel Co., has been elected president of the Detroit Athletic Club to succeed Hugh Chalmers, who is retiring. Other officers are: A. E. Larned, first vice-president; Roy D. Chapin, second vice-president; Julius Haass, treasurer, and C. A. Hughes, secretary.

Hastings Is V. P. of Hupp—Charles D. Hastings has been elected vice-president and general manager of the Hupp Motor Car Corp., Detroit. Mr. Hastings has been with the company ever since its inception, with the exception of two years, 1915 and 1916.

E. A. Laboratories Horn Agency—Sanford Bros., Chattanooga, Tenn., are now representatives of the E. A. Laboratories, Brooklyn, N. Y., for motor cars horns in the West as far as the Pacific coast and in the South as far as Florida.

Erects Large Service Building—The new building of the Overland-Detroit Co., Detroit, in process of erection will be completed soon. The structure, which will be devoted to the service work of the company, is 160 ft. by 190 ft., has 112,000 sq. ft. of floor space, contains four floors, is made of reinforced concrete with cantilever construction and is so built that four additional floors can be added at a later time. The company will have a machine shop, electric welding equipment, blacksmith shop, painting, trimming and all other departments calculated to ex-

tend complete services here. About 100 men will be employed. During the 1916 season, the company sold 2200 Overland and Willys-Knight cars.

To Have New Home—Fred P. Brand Motor Co., Cleveland agent for Pierce-Arrow cars, will erect a new fireproof building with sales, service and garage departments at a cost of $150,000.

Peed With N. Y. Overland Co.—L. G. Peed, manager of the Philadelphia branch of the Maxwell Motor Sales Corp., has resigned to join the staff of the Willys-Overland Co. in New York.

Opens Branch in Buffalo—The Pennsylvania Rubber Co., New York, has opened a branch in Buffalo with A. R. Wendell, formerly of the Pittsburgh branch, manager. A full stock will be carried.

Sales Company Formed—The firm of Nickels, Jackson & Lavenberg has been formed at Toledo, Ohio, to handle the agency for the Stearns-Knight cars. The company was incorporated for $25,000.

Amazon Agency in Cleveland—The Amazon Tire & Rubber Co., Akron, Ohio, has appointed the Strong, Carlisle & Hammond Co. Cleveland distributor. The tires formerly handled by the Cleveland concern will be dropped in favor of the new anti-blowout tire.

Darland Managers Tulsa Co.—C. E. Darland has been appointed general manager of the Tulsa Automobile Co., Tulsa, Okla. W. A. King has been made factory and production manager. The Tulsa Four, the Company's product, was recently exhibited at a Tulsa hotel.

Empire Tire Co. Reorganizes—The Empire Rubber & Tire Co., Trenton, N. J., has reorganized with a capital of $4,500,000. J. E. Baum, director of the Corn Exchange National Bank, New York, and president of the Supplee-Riddle Hardware Co., Philadelphia, heads the reorganized company.

Changes in Milwaukee National Agency—The Olympian Motor Sales Co. of Milwaukee has been organized with Dr. J. F. Schreiber as general manager to distribute the National and Olympian in this territory. Dr. Schreiber, who is one of the earliest motor car dealers in the northwest, recently withdrew from the Schreiber-Boorse Motor Car Co., Milwaukee, distributer of the National and Chandler. The last-named car is now being distributed by the Achen Motor Car Co., Milwaukee, of which H. C. Boorse is a large stockholder.

Tubeless Tire & Rubber Co.—The Tubeless Tire & Rubber Co., Millersburg, Ohio, has increased its capital from $75,000 to $1,000,000.

East Palestine Rubber Co.—The East Palestine Rubber Co., East Palestine, Ohio, has increased its capital from $500,000 to $1,000,000.

Schwartz Wheel Plans Extension—The Schwartz Wheel Co., Philadelphia, has purchased ground in Frankford adjoining its property on which it will build a new plant. The lot is 163 by 207 ft.

Parker on Long Trip—Walter E. Parker, president of the Commerce Motor Car Co., Detroit, sailed from Vancouver Jan. 25 for Singapore. He also will visit the Federated Malay States and other neighboring countries.

Course for Motor Car Men—The University of Michigan will provide a short course, commencing next summer, for men interested in the motor car industry. It will include mechanical engineering, sales work, operation and design of the motor car.

To Supply Aeroplane Bearings—D. W. Rodger of the Muzzy-Lyon Co., Ltd., manufacturer of motor bearings, has completed arrangements with the Duesenberg Motor Co. to furnish it with bearings to be used in the motors it is now building for the government aeroplanes.

Kunz Machinery Co. Reorganizes—The J. L. Kunz Machinery Co., Milwaukee, which was established 25 years ago, has reorganized as the Kunz Wheel Co. with $100,000 capital to devote its attention exclusively to the manufacture of resilient sheet steel wheels for motor cars and trucks.

Hayes Co. Stock on Sale—The stock of the Hayes Mfg. Co., Detroit, which recently increased its capital, is being offered for sale. The stock offered amounts to $625,000 and is the new issue, the concern now being capitalized at $1,500,000. The dividend rate is 12 per cent, payable quarterly. The business of the company has increased from $750,000 to $3,500,000 within the last 2½ years and net earnings applicable for dividends have increased from $103,760 for the fiscal year ending June, 30, 1915 to $280,000 for the period ending June 30, 1916. The new stock is to be listed on the Detroit Stock Exchange.

Black Heads Philadelphia Branch—Robert F. Black, formerly with the factory of the International Motor Co. at Allentown, Pa., has been made manager of the Philadelphia branch, handling Mack and Saurer trucks.

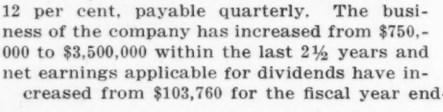
To Manufacture and Job—The Trindl Machine Works has been established in Chicago to make and job pistons, piston rings, wrist pins, crankshafts, valves and so on as well as to do general machine work. Joseph H. Trindl, formerly of Trindl & Ryser, is head.

To Give City Auditorium—The Packard Motor Car Co., Detroit, plans to include a large auditorium in its new sales and service building, and this auditorium is to be given over to the city for use. The structure is to cost $1,000,000 and will cover a block. The site was purchased several weeks ago.

Chicago Dealer Holds Convention—A midwinter convention of associate dealers of the Centaur Motor Co., Chicago Jeffery dealer, was held at the company, salesrooms recently. Sixty-seven dealers attended, and they were taken to Kenosha, Wis., in special Pullmans to inspect the Nash factory. On their return to Chicago they were the guests of the Chicago agency at the theater. The convention was such a success that it is to be held semi-annually.

Buys Potter Mackie Mfg. Co.—The North American Motors Co., Pottstown, Pa., which was incorporated last November to make gasoline engines for motor cars and for general machine work, has bought the assets of the Potter Mackie Mfg. Co. This spring it expects to build a plant on the 4-acre plat it owns at Pottstown and will manufacture 45-, 30-, and 20-hp. engines, formerly made under the name of Hazard, for commercial vehicles.

Goodyear Teaches Deaf Mutes—The Goodyear Tire & Rubber Co., Akron, Ohio, has expanded its factory schools to include the deaf mutes who work for it. Business arithmetic, English and mechanical drawing have been found to be most interesting to them. Other subjects will be added from time to time. Ashland D. Martin, himself a deaf mute and a graduate of Gallaudet College, is director of the new undertaking.



Buffalo, N. Y.—Lutz Motor Co.; capital stock, $200,000; John H. McLean, George B. Hurd, George H. Lutz, Orman H. Lutz and Levi R. Lupton.

Chicago.—Ames Tire Co.; capital stock, $10,000; incorporators, Willard C. Campbell, Isaac C. Ames and Francis C. McCarty.

Chicago.—National Motor Sales Co.; capital stock, $10,000; incorporators, George Pearson, Samuel L. Cohen and Thomas M. Whitson.

Columbus, Ohio.—Sandow Motor Truck Co.; capital stock, $20,000; to deal in motor trucks; incorporators, M. A. Corbett, R. J. Corbett, P. L. Cordray, B. B. Sawyer and J. M. Hallissy.

Cincinnati, Ohio.—Cincinnati Lee Tire Co.; capital stock, $5,000; to deal in tires; incorporators, Harry F. Thompson, William J. Rieker, A. P. Miller, Carl A. Tettenborn and Ernst A. Tettenborn, Jr.

Cincinnati, Ohio.—United States Truck Sales Co.; capital stock, $10,000; incorporators, R. C. Stewart, R. S. Stewart, O. L. Carpenter, M. H. McLean and Joseph R. Menzinger.

Covington, Ky.—Theisson Auto Supply Co.; capital stock, $7,000; incorporators, W. M. Theissen, John B. Theissen and H. D. Theissen.

Covington, Ky.—U. S. Truck Sales Co.; capital stock, $10,000; incorporators, R. C. Stewart, R. S. Stewart and O. J. Carpenter.

Denver, Colo.—Sterling Oil Co.; capital stock, $50,000; incorporators, George A. Henderson, M. L. Babcock and C. F. Smith.

Denver, Colo.—Loveland Rubber Works; capital stock, $10,000; to sell tires; incorporators, H. A. Bonnell, C. A. Stump and B. Hansen.

Denver, Colo.—Two-Way Tractor Co.; capital stock, $100,000; incorporators, W. Ray Drake, Ira Scott and C. L. Bishop.

Denver, Colo.—Merchants Auto Dispatch & Transportation Co.; capital stock, $50,000; incorporators, Harry G. Ferguson, Ida M. Ferguson and Robert L. Meyers.

Denver, Colo.—Mountain Motors Co.; capital stock, $50,000; to distribute cars; incorporators, S. N. Hicks, Bert Williams and C. H. Hanington.

Denver, Colo.—Lexington Colorado Auto Co.; capital stock, $15,000; to distribute cars; incorporators, D. E. Trogler, J. H. Naylor and W. Vickerman.

Dover, Del.—Lewis Motor Corp.; to manufacture motors, motor cars and engines; capital stock, $500,000; incorporators, F. D. Buck, George W. Dillman and M. L. Horty.

Des Moines, Iowa.—Iowa Tire Co.; capital stock, $15,000; incorporators, R. A. Morton, S. C. Williams and Ralph Law.

Dubuque, Ia.—Bolsky-Cook Motor Co.; capital stock, $50,000; incorporators, Charles J. Bolsky, Lester Cook and J. M. Bolsky.

Huntington, W. Va.—West Virginia Motor Car Co.; capital stock, $25,000; incorporators, J. C. Hammatt, M. F. Dwyer, John S. Sheppard, G. G. Smith and S. S. Spencer.

Kansas City, Mo.—Elvan & Breting Motor Co.; capital stock, $5,000; incorporators, M. A. Flynn, George T. Breting and J. F. Flynn; to buy and sell motor cars and deal in accessories and repairs of all kinds.

Kilbourn, Wis.—Marshall Mfg. Co.; capital stock, $25,000; to manufacture tools, street scrapers, etc.; incorporators, F. H. Marshall, H. H. Bennett and C. M. Morris.

La Grange, Texas.—Texas Motor Co.; capital stock, $10,000; incorporators, H. H. Ford, P. L. Davis and E. C. Gullmartin.

Lexington, Ky.—Two States Motor Co.; capital stock, $10,000; incorporators, J. W. Crutcher, A. V. Combs and Nail Combs.

Lexington, Ky.—Central Auto Co.; capital stock, $5,000; incorporators, A. S. Foley, William Gum and W. C. Griffin.

Madisonville, Ky.—Ross Garage Co.; capital stock, $6,000; incorporators, Claude L. Ross, Ellen P. Ross and James B. Ross.

Madison, Iowa.—Madison Auto Supply Co.; capital stock, $25,000; incorporators, T. R. Smith, R. E. Smith and A. W. Smith.

Milwaukee, Wis.—The Edgar F. Sanger Co.; capital stock, $25,000; to deal in new and used cars, operate garage, etc.; incorporators, Edgar F. Sanger, E. G. Wurster, Glenway Maxon and A. Borst.

Milwaukee, Wis.—AI Trucking Co.; capital stock, $10,000; to sell and operate trucks; incorporators, George C. Holmes and Wm. J. P. Aberg.

Milwaukee, Wis.—Milwaukee Auto Painting Co.; capital stock, $5,000; incorporators, Donald C. Barbee, H. O. Wolfe and M. Horth.

Milwaukee, Wis.—The American Safety Signal Co.; capital stock, $10,000; incorporators, H. W. Momerow, Charles Manel and Nels Nelson.

Raleigh, N. C.—Corbett Motor Truck Co.; capital stock, $100,000; incorporators, R. J. Corbett, A. Cooper, J. D. Cooper, A. A. Zollicoffer, and others.

Sedro-Woolley, Wash.—Starr Motor Truck & Tractor Attachment Co.; capital stock, $25,000; incorporators, C. E. Starr and John A. Thompson.

St. Joseph, Mo.—Trachsel Motor Car Co.; capital stock, $16,000; incorporators, G. E. Myers, J. E. Myers, R. S. Trachsel, C. P. Jamison and G. Burger.

Tulsa, Okla.—Purdy Motor Co.; capital stock, $30,000; incorporators, R. M. Purdy, L. M. Smith and Albert H. Bell.